



# United States Department of the Interior

BUREAU OF LAND MANAGEMENT  
National Historic Oregon Trail Interpretive Center  
P.O. Box 987  
Baker City, Oregon 97814-0987  
<http://www.or.blm.gov/NHOTIC/>



IN REPLY REFER TO:  
1792

Dear Public Land User:

Thanks you for your interest in the Vegetation Management Environmental Assessment (EA) for the National Historic Oregon Trail Interpretive Center (NHOTIC) at Flagstaff Hill.

Your careful review and comment on the attached draft EA are appreciated. Management alternatives have been identified, described, and analyzed as a result of interdisciplinary teamwork, and from public comments received during the initial planning process. Each of the sections within the document contains important and relevant material relating to the future management of natural and cultural resources, as well as public safety issues at NHOTIC.

Another public meeting has been scheduled for January 18, 2000, at 7:00pm, at the Baker Resource Area office, 3165 10<sup>th</sup> Street, Baker City, OR. The 30-day comment period runs from January 3 - February 2, 2000. Please send your written comments to:

Center Director  
National Historic Oregon Trail Interpretive Center  
P.O. Box 987  
Baker City, OR 97814

If you have any questions or need assistance, please contact Shirley Baxter, EA Team Lead, at (541) 523-1845.

Thank you for your interest in the management of your public lands.

Sincerely,

*s/David B. Hunsaker*

David B. Hunsaker  
Center Director

## **Acronyms and Abbreviations**

ACEC	Area of Critical Environmental Concern
BLM	Bureau of Land Management
EA	Environmental Assessment
EPA	Environmental Protection Agency
IDT	Interdisciplinary Team
NEPA	National Environmental Policy Act
NHOTIC	National Historic Oregon Trail Interpretive Center
PNC	Potential Natural Community
RMP	Resource Management Plan
ROD	Record of Decision
USDA	U.S. Department of Agriculture

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# **VEGETATION MANAGEMENT ENVIRONMENTAL ASSESSMENT for the National Historic Oregon Trail Interpretive Center**

## **Chapter 1 - Purpose of and Need for Action**

This chapter establishes the background for the project, describing the area, establishing the need for action, and listing issues around which the alternatives are developed. Documents used to guide management of this area include:

The Proposed National Historic Oregon Trail Interpretive Center at Flagstaff Hill  
Environmental Assessment/Decision Record (December 1988)

Baker Resource Management Plan Environmental Impact Statement/Record of  
Decision (July 1989)

Northwest Area Noxious Weed Control program Environmental Impact Statement/  
Record of Decision (April 7, 1986)

Vegetation Treatment on BLM Lands in Thirteen Western States Environmental  
Impact Statement/Record of Decision (August 14, 1991)

Noxious Weed Environmental Assessment/Decision Record; Vale District 5-Year  
Noxious Weed Control Program (June 1994; in the process of revision, 1999)

### **Introduction**

In 1988 the decision record and environmental assessment (EA) which created the National Historic Oregon Trail Interpretive Center (NHOTIC) recommended that a vegetation rehabilitation plan be developed to provide direction in recreating the historic scene that was viewed by the emigrants as they ventured into the area. This document is a new EA which addresses management of approximately 500 acres, including the corridor area utilized for livestock transportation across BLM-managed land to private land, and not directly including the buildings. The Center Director of NHOTIC of the Vale District of the Bureau of Land Management (BLM), is proposing management actions at NHOTIC on the area around the structures, to include the vegetation, wagon trail ruts, and interpretive opportunities created from vegetation management.

NHOTIC encompasses:

- Ž 509 acres, including a 23,000-square-foot Interpretive Center; maintenance/curation building, fee booth;
- Ž 4.2 miles of interpretive trail system;
- Ž a living history wagon encampment;
- Ž a lode mine;
- Ž wildlife (including deer and sage grouse)
- Ž Oregon Trail ruts

The purpose of NHOTIC is to provide an educational opportunity for the public to learn about the history of the Oregon Trail, and related topics of American Indian culture, mining and early settlement in Baker County, natural history along the Oregon Trail, pre-emigrant travel and the role of General Land Office Grazing Service (precursor to the BLM). This is achieved through interpretive programs and exhibits as well as hiking trails, outdoor interpretive exhibits, and a preserved segment of Oregon Trail wagon ruts. The Center serves as a focal point for the cultural heritage traveler, and contributes to a viable tourism industry for the area.

As noted above, several documents guide the analysis process, primarily the NHOTIC EA and Baker Resource Management Plan, with noxious weed management guidance provided by the cited documents (page 1).

A map in the appendix displays the location of NHOTIC, which lies east of Baker Valley and northwest of Virtue Flat adjacent to Highway 86, the main route to Richland, Halfway, and the Snake River.

### **Existing Condition (Affected Environment)**

An existing condition report was prepared for each resource within the planning area. The existing condition was compared to the desired condition for the vegetation and human uses for the area. The existing condition information pinpointed some situations which this proposal plans to manage. An edited version of the existing condition report may be found in the appendix.

### **Purpose and Need for Action**

The goal for vegetation management at NHOTIC is to provide an interpretive setting similar to the landscape which would have been seen by the early emigrants traveling along the Oregon Trail.

Based on the comparison of existing condition to the desired future condition, the interdisciplinary team (IDT) determining the following:

- Ž In some cases, vegetation build-up is creating a hazard to public safety.

- Ž Existing vegetation is not the same as that which was present during the time of the Oregon Trail emigration.

There is a need to maintain or restore the vegetation to a period during which the Oregon Trail was most active (1843-1865) in order to provide a more realistic interpretation of the setting for the public. However, considerations for visitor safety may dominate vegetation management in high-intensity public-use areas and safety zones, because management of a natural landscape setting poses inherent public safety risks in an ecosystem naturally adapted to periodic wildfire.

## **Proposed Action**

The purpose of the proposed action is to correct the situation over time by:

- Ž Reducing the amount and kind of non-native vegetation through fire, manual labor, mechanical manipulation, and/or application of herbicide spray. Special emphasis would be placed on reducing and eliminating noxious weeds and undesirable non-native species, and planting or seeding native stock and desirable species following treatment to restore the appearance of natural ecosystems.
- Ž Using prescribed fire to manage vegetation, simulating possible landscape burns which may have occurred in the past, and to reduce the hazardous accumulation of brush and herbaceous fuels in some settings.
- Ž Managing vegetation to include a full range of natural habitat types and seral stages to provide wildlife habitat, interpretive and educational opportunities, and research opportunities for managed ecosystems.
- Ž Clearing vegetation from the Oregon Trail wagon ruts so that they would be more visible to the public.

Combinations of these actions result in the alternatives including the proposed action. Alternatives are discussed in Chapter 2.

## **Scoping**

The possible actions and goals were discussed at a public meeting held in Baker City,

Oregon, October 6, 1998. Comments were collected from the attendees to help define the issues and alternatives. A public comment period was also announced during this time to collect written comments as well. The announcement was sent to media contacts found within the region and to a mailing list consisting of interested parties. A Federal Register notice was printed and a news release was sent to media contacts announcing the completion of the draft environmental assessment, the public comment period, and the public meeting on January 18, 2000.

## **Key Issues**

The following five key issues were identified during the public scoping process.

### **Public Safety**

Vegetation build-up at selected sites in the planning area and surrounding the Center could pose a fire hazard to the visiting public. The extent and density of brush species are of particular concern.

### **Wildlife Habitat**

Lack of management or over-management may reduce the available habitat for some wildlife species, specifically sage grouse.

### **Natural Diversity**

Portions of the original native plant communities have been replaced or are being invaded by non-desirable weed species. In addition, Secar bluebunch wheatgrass, a cultivar planted during reclamation, now dominates the visual foreground aspect of landscape along access roads and trails. It is beginning to spread and out-compete the native Idaho fescue. Natural ecological processes have been altered or interrupted.

### **Public Education and Natural History Interpretations**

Interpretation of natural history can be improved with opportunities to contrast a restored historic landscape at NHOTIC with modern landscape in adjoining properties. It is desirable to add opportunities for visitors to see and learn about native plants and wildlife. Educating the public about actions to manage vegetation can promote greater understanding of issues of weed control, prescribed burns, and wildlife habitat.

### **Oregon Trail Wagon Ruts**

The wagon ruts are no longer as visible as they once were, due to vegetation encroachment and general weathering.



## **Additional Resource Concerns**

Other resources are of concern and where there are impacts, they will be addressed in the analysis (Chapter 3). These resources include:

- Ž Soil and soil productivity
- Ž Recreation and visual resources
- Ž Interpretive center and support buildings
- Ž Air quality
- Ž Threatened or endangered species

Resources or other areas of concern which will not be affected include:

- Ž Cultural resources (areas beyond or outside the wagon ruts)
- Ž Native American Rights (treaty and religious)
- Ž Environmental justice
- Ž Wilderness study areas
- Ž Prime farmland
- Ž Wild and scenic rivers
- Ž Areas of critical environmental concern (ACECs)
- Ž Floodplains, wetlands, surface or ground water
- Ž Minerals resources
- Ž Fisheries
- Ž Forestry management
- Ž Off-road vehicle use

## **Desired Future Condition**

The general desired future condition is actually a range of conditions, based on time frames and goals for the resources involved in the project. Overall, the goal for NHOTIC is to provide a realistic experience for visitors to the Center, while maintaining public safety. The major factor contributing to the visitor experience is the view and vegetation, combined with immersion into the time and place setting of the emigrants. The goal of this project is to restore as much of the historic levels of vegetation as possible while providing for a safe experience for visitors.

## **Chapter 2 - Alternatives, Including the Proposed Action**

This section identifies any alternatives eliminated from detailed study and then lists alternatives developed. A list of constraints, mitigation measures (design features) and monitoring needed for all action alternatives follows the comparison of alternatives chart.

A “no action” alternative is included as part of a reasonable range of alternatives as required by the National Environmental Policy Act (NEPA).

### **Alternatives Eliminated from Detailed Study**

An alternative was proposed by some members of the public during a public meeting. The purpose of this alternative would be to achieve vegetative manipulation through the use of domestic livestock grazing. It was expressed that rather than burn the forage to reduce hazards, livestock could utilize it. However, early analysis indicated that this alternative would be inappropriate for the following reasons:

The EA which established NHOTIC and the BRA RMP/EIS eliminated livestock grazing from within the planning area. Livestock grazing was not a part of the historic setting (pre-1860s). On-site support facilities (e.g., water troughs) were also eliminated. The purpose of this project is not to re-visit the original EA establishing NHOTIC in order to change part of that decision. Even though livestock grazing was eliminated, water access was provided for adjacent grazing use and fencing was installed to prevent incidental grazing from adjacent herds within NHOTIC boundaries.

The microbiotic crust has been reduced and altered by historic grazing. Protecting and allowing continued recovery and ecological succession of this part of the sagebrush/grassland ecosystem within the livestock exclosure is essential to provide an accurate historical-ecological setting. This also provides a research opportunity for comparison and study of microbiotic crust development unique to the geographic area. Even light grazing intensity within the livestock trailing corridor dramatically interferes with this ecological recovery process, reducing species diversity and density.

Introduction of livestock would require a substantial support system: additional fencing and water sources, as no water impoundments or natural sources exist.

Livestock would generate their own trails, as well as use any public trails not fenced. Additional maintenance would be needed to keep trails clean, increasing administrative costs. New trail disturbance would increase costs for controlling weeds and exotic species.

Livestock grazing would tend to favor establishment and continued expansion of sagebrush while reducing cover of native grasses and wildflowers. Cattle grazing

tends to selectively reduce grasses and some wildflowers while favoring brush and certain less palatable forbs. Sheep grazing tends to reduce a broader spectrum of wildflowers than cattle grazing. Trampling from any class of livestock would tend to reduce density and species richness of the microbiotic crust flora. Reintroduction of livestock would thus be counterproductive to public safety and interpretive objectives, and would require additional investment in sagebrush control over the long term.

This alternative would not meet the purpose and need for the planning area. There are adequate grazing and public viewing opportunities on adjacent private land without re-introducing livestock on this portion of public land.

Other alternatives considered were variations of the proposed actions. Some of the treatments identified in the proposed action could conceivably be used exclusively, not in combination with other treatment methods:

- Ž Use of fire exclusively
- Ž Use of herbicides exclusively
- Ž Use of mechanical treatments exclusively

None of these alternatives were considered in detail, because it was determined that combinations of all the treatments were needed in concert to accomplish the purpose and need in a timely manner.

### **Process used to Develop Alternatives**

Alternatives to the proposed action incorporate essentially the same types of actions, and vary chiefly in the size and range of time for implementation of the prescribed fire treatment. Acreage of mechanical treatment, planting, and seeding of native species would be more or less compressed over time, along with prescribed fire, to take advantage of opportunities to replace non-native species impacted by the fire. Treatment of noxious weeds would not change under any of the alternatives.

Eight different vegetation treatment units (referred to as units) are described (see appendix for details), based primarily on dominant vegetation components, slope and aspect, and character and degree of human use. These reflected factors relate to public safety, sage grouse habitat, and interpretive program objectives.

IDT members determined that implementation time frames and ecosystem and landscape scales of analysis were the main distinguishing elements among available alternatives capable of meeting program objectives.

## **Alternatives**

The alternatives are described below. A chart on page 11 compares the alternatives. Key indicators are listed with each issue in relation to the impacts that particular alternative may have on that issue. Indicators are used to measure the effects of implementing the alternatives on issues and resources.

### **Alternative A - No Action**

Under this alternative, there would be no change to the way vegetation is managed.

Exhibits and other kinds of construction such as the Lode Mine would continue to be built to demonstrate historic uses. Present management includes mechanical and/or chemical treatment to implement fire safety management around the buildings (Unit 8 and maintenance buildings), trails, and parking lots. Currently heavy concentrations of vegetation which are considered hazards are managed within 30 feet of trail and within Unit 8 (see map in appendix). Vegetation management occurs as time, budget, and work force are available.

Treatment includes selectively mowing or removing vegetation that is close enough to ignite structures or create high heat and flame hazards to people; chemical treatment is done according to guidance mentioned on page 1 of this document.

In general, vegetation beyond the buildings would continue to arrive at its own balance, except for fuels concentrations near trails.

### **Alternative B - Proposed Action**

This alternative is the proposed action for restoring and/or maintaining native plants in the planning area. Prescribed fire, mechanical and chemical treatments, plantings would be used alone or in combination to thin and stimulate shrubs and grasses, reduce and eliminate exotic and other undesirable plants and noxious weeds, and reduce wildfire hazard.

Under this alternative, active management would favor the re-establishment and maintenance of plant communities resembling the descriptions of potential natural plant communities, would meet the goal to provide the desired interpretive background, and accomplish most of the wildfire hazard reduction goals. Selected native plants would be cultivated for transplanting stock and to provide native seed.

Prescribed fire would be utilized to restore natural ecosystem processes, reduce sagebrush density, and reduce hazardous fuels on half the acreage in the planning area (250 acres). Subject to appropriate weather conditions, it is anticipated that this acreage would be burned with one or more prescribed fires within 1 to 5 years after completion of this EA. Wildfire hazards would be treated in order of priority, beginning with sites around the center, trails, and

parking lots, through a combination of mechanical and prescribed fire techniques. Approximately 30% of the acreage treated (75 acres) would remain unburned or incompletely burned, with a sagebrush cover of 15% or greater. Over the long term, prescribed fire would be used to similarly treat the remaining 250 acres of the planning area within approximately 20-30 years after completion of this EA. Subsequently, vegetation would be treated as part of the larger sagebrush/grassland ecosystem surrounding it, expected an average fire return interval of 25-75 years (USDA 1996) on any particular portion of the landscape. Portions of vegetation units 4, 5, and 6 (up to 60 acres) may be more intensively and frequently managed with prescribed fire or mechanical means to maintain low sagebrush densities to meet public safety concerns.

In general, the first 5 years of actions would concentrate on reduction of sagebrush density in the upper portions of Units 4, 5, and 6 (see map in appendix) to meet public safety objectives. Some acreage within Units 2, 3, and 4 would be burned primarily to meet interpretation objectives and restore natural ecological processes.

## **Alternative C**

Alternative C is a variation of the Alternative B, in which the approximately 500 acres in the planning area are considered as a separate “ecosystem” by itself. About 75 acres around roads, trails and buildings would be perpetually managed to maintain very low sagebrush densities (0-5%) The primary differences under this alternative stem from implementing prescribed fire on approximately 75-90 acres every 10 years. However, implementation of each 10-year segment may require 1-3 years, depending on weather conditions. Within prescribed fire treatment areas, sagebrush densities would be uniformly reduced to low levels (0-8%) immediately after treatment, then allowed to recover naturally over the succeeding 50 years. Sequential treatment of portions of the landscape would ensure retention of late-seral, dense sagebrush habitat.

The fire return interval would assist in re-establishing a 25 to 75 year fire return interval for the vegetation. The planning area would still be divided into eight vegetation units, as per Alternative B (see map in appendix). Concerns and objectives for vegetation management as described under Alternative B are the same for this alternative. Proposed treatments by unit would be changed to reflect the different perspective of this alternative.

Under this alternative, re-establishment and maintenance of plant communities would meet the goal to provide the desired interpretive background and accomplish some of the fuels hazard reduction goals, but over a much longer time period than under Alternative B.

Vegetation within the planning area would be treated as a “sagebrush/grassland ecosystem” separate from the landscape surround it, expecting an average fire return interval of 25-75

years on any particular portion of the landscape.

In general, the first round of prescribed fire would concentrate on reducing sagebrush density on the upper portions of Units 4 and 5, with minor mechanical control in Unit 6 to meet public safety objectives. Some acreage within Units 2 and 3 would be burned primarily to meet interpretation objectives and restore natural ecological processes.

## **Alternative D**

Alternative D is a variation of Alternative B, in which prescribed fire is implemented on the entire habitat except Unit 8 within the planning area. However, a sequence of burning would still occur, so that the entire landscape would not be blackened all at once. It is anticipated that the landscape could be completely burned within a 5-year period, weather conditions permitting. Approximately 30% of the total acreage (150) would remain unburned or incompletely burned, with a sagebrush cover of 15% or greater. Portions of vegetation units 4, 5, and 6 (up to 60 acres) may be more intensively and frequently managed with prescribed fire or mechanical means to maintain low sagebrush densities to meet public safety concerns.

Once the entire area had been burned, prescribed fire would not be introduced again for approximately 25 years or more. Subsequently, vegetation would be treated as part of the larger sagebrush/ grassland ecosystem surrounding it, with an expectation of an average fire return interval of 25-75 years (USDA 1996) on any particular portion of the landscape.

Intensive management of vegetation along trails would be necessary during the period before re-ignition in order to control fuels build-ups along trails. This aspect of implementation would increase over present levels. Crews would cultivate selected native plants for transplanting stock as well as gather native seed. Efforts to remove non-native vegetation and Secar bluebunch wheatgrass would be extended out systematically along trails and road sides. Spot treatment of herbicides would be used to follow up prescribed fire treatments in portions of areas dominated by annual weeds or grasses.

## Comparison of Alternatives

This table summarizes the effects of each alternative, based on key indicators, issues, and other relevant resource values.

KEY ISSUES	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D
<b>Public Safety</b>				
Fire hazard	Reduction of fuel hazard only through mechanical and/or chemical treatment of noxious and exotic weeds in Unit 8 and around structures in Unit 4. No treatment of heavy brush/grasses throughout remainder of planning area.	Reduction of fuel hazard (250) acres through burning during first 5 years of implementation (Units 2,3,4,5,6). Mechanical and/or chemical treatments of noxious and exotic weeds in all units. Follow-up treatment of remaining 250 acres in 15-20 years.	Reduction of fuel hazard (75-90 acres) through burning during first 10-15 years in Units 3,4,5,6. Mechanical and/or chemical treatments of noxious and exotic weeds in all units. Follow-up treatments of 75-90 acres every 10-15 years.	Reduction of fuel hazard (500 acres) through burning during first 5 years in all but Unit 8. Mechanical and/or chemical treatments of noxious and exotic weeds in all units.
Escape routes	No change to current condition	Creation of "safe" zones	Same as Alt. B.	Same as Alt.B.
<b>Wildlife Habitat</b>				
Sage grouse winter range	No change to current condition.	Decrease by approximately 146 acres in 5 years and 292 acres in 10 years.	Decrease by 249 acres in 30 years, but increase thereafter.	Decrease by 290 acres within 5 years.
Sage grouse movement corridors	No change to current condition.	Not as much as available, but corridors still exist.	Same as Alt. B.	Only 125 acres available for corridors if positioned properly.
Sage grouse forage	No change to current condition.	Decrease immediately by 146 acres, but increase thereafter.	Decrease immediately by 83 acres but increase thereafter.	Decrease by 290 acres immediately and would recover minimally.

<b>Natural Diversity</b>				
Žvegetation	No intentional change. High probability of major change due to wildfire.	Reduce sagebrush density and extent. Gradually replace exotic species with native species.	Same as Alt. B Timing and extent of change slower over first 30 years.	Same as Alt. B. Timing and extent of change rapid compared to all other alternatives.
Žmicrobiotic crust	Gradual increase in species diversity and density over time. Greatest risk of damage due to potential intensity of wildfire conditions.	Gradual increase in species diversity and density over time. Short term reductions in density and shift in species dominance due to prescribed fire.	Same as Alt. B.	Same as Alt. B
Žnoxious/exotic weeds	Continued treatment of noxious weeds in all Units. Replace other exotic species with low growing native species around public use areas and buildings.	Same as under Alt. A. Reseed with native plants following mechanical and/or chemical treatment.	Same as under Alt. B.	Same as under Alt. B.
<b>Public Education/Natural History Interpretation</b>				
Žcultural resources	No change to current situation.	Same as Alternative A	Same as Alternative A	Same as Alternative A
Žvistas and viewpoints	Exotic species and unnatural conditions dominate portions of landscape.	Landscape integrity and natural conditions restored over period of 20-30 years.	Landscape integrity and natural conditions restored over period of 30-40 years.	Landscape integrity and natural conditions restored over period of 5-10 years.
<b>Oregon Trail Wagon Ruts</b>	No change to current situation.	Increased visibility and improved accessibility for visitors. Potential blackening of landscape for 1-2 years around ruts.	Same as for Alternative B	Same as for Alternative B.



Other Resource Elements				
Air quality	No change to current situation, barring wildfire occurrence. Should there be a wildfire, it would produce heavy smoke and potentially endanger human health, safety, and structures. The entire 500 acres could be involved, as well as adjacent lands.	Prescribed fire would be conducted to address air quality and smoke management through timing, weather conditions, and wind direction. Scheduled burns would be announced publicly.	Same as under Alt. B, plus the potential for wildfire.	Same as under Alt. B, although results would be similar to a wildfire.
Soil and Soil Productivity	No change to current situation, although a wildfire and subsequent suppression could result in soil compression, compaction, erosion. High intensity burns could damage soil productivity.	Prescribed fire would be of low to moderate intensity, minimizing soil damage. There could be short-term (1-5 years) risk of soil erosion. Re-seeding would accelerate plant re-establishment. Up to 250 acres could be exposed in the first 5 years.	Same as under Alt. B. From 100-150 acres of soil could be exposed every 10-15 years.	Same as Alt. B, but with the potential for more soil exposure at one time, similar to a wildfire.

## **Mitigations**

Within prescribed fire treatment units, ignition and control methods would be adjusted to ensure that portions of the habitat would remain unburned or incompletely burned. Long-term objectives of all action alternatives would be to retain 30% of the acreage within the Interpretive Center grounds with a (visually dominant) sagebrush canopy cover greater than 15%.

Mechanical treatments for fuel reductions in Unit 8 would be completed prior to initiation of prescribed fire on other vegetation management units.

To ensure firefighter safety prescribed burn plan prescriptions and fireline safety procedures would be strictly followed at all times.

The design features and mitigation measures for herbicide application as described in the Vale noxious weed EA (OR-030-89-19, as amended in 1994; see page 1) would be strictly followed. All herbicides would be applied in accordance with EPA label requirements.

Protection of cultural resources along the Oregon Trail (rut swales, Ezra Meeker marker) would be included in plan for manual treatment of prescribed burns. Primary concern is damage caused by vehicles which may be in the vicinity of these resources.

Th "Interim Air Quality Policy on Wildland and Prescribed Fires" issued April 23, 1999, directs public land manager to protect public health and welfare by mitigating the impacts of air pollutant emissions on air quality and visibility for all wildland and prescribed fires managed to achieve resource values. Prior to actual ignition of any prescribed fire, an approved Prescribed Fire Burn Plan would include information and techniques necessary to reduce or alter impacts to air quality.

### *Wildlife Mitigations*

#### Alternative B

Scheduling prescribed fire in the planning area to burn 5 to 10 small (12.5 acres to 25 acres each) prescribed fire units over the course of 5 years, would enable wildlife immediately displaced by those individuals fires to seek protection in adjacent units that have yet to be or would not be burned. This would also maintain a travel or migration corridor for wildlife through the planning area.

#### Alternative C

By strategically placing the prescribed fire units in the planning area to allow for a wildlife

travel and migration corridor through the planning area, sage grouse and pygmy rabbits and other wildlife species dependent upon sagebrush for cover and protection, would continue to use the area.

#### Alternative D

By positioning the 125 acres of sagebrush habitat, that is to be managed to retain 15% to 20% cover levels, to allow protected travel through the planning area by wildlife, use of the area by wildlife would continue. However, this use would be at a reduced level compared to the other alternatives.

#### **Monitoring**

Fire behavior monitoring is a part of the burn plan (monitoring pre-treatment and post-treatment would be done on a 3-5 year cycle).

Photo monitoring showing increase/decrease trends.

Use photos to document fires for interpretive purposes (and videos).

Trend plots, line transects for vegetation composition and density.

Reporting the number of acres treated per year through burning, mechanical and/or chemical treatments.

Effectiveness of re-seeding efforts.

## Chapter 3 - Effects Analysis

The IDT addressed each of the key issues below by describing the direct, indirect, and cumulative impacts through implementation of each alternative. Other effects are also addressed, such as air quality. In addition, a section of disclosures is included to assist in determining significance and the potential for development of an environmental impact statement.

### Alternative A - No Action

#### Public Safety

##### Direct and Indirect Effects

The risk of a wildfire ignition would continue to be high, particularly adjacent to the Highway 86 corridor, around the Interpretive Center, and in high-use foot traffic areas along trails. The risk would remain highest from late May (when grasses, forbs, and weedy vegetation dry out) until mid- to late October (when fuel moisture levels return). The seeded native grass, Secar bluebunch wheatgrass, has the ability to burn intensely for longer periods of time with greater flame lengths than the typical native grassland types. Enhanced by constant and predictable winds, a fire ignited in or carrying through these areas or in any of the exotic grasses would move quickly into the adjoining sagebrush/rabbitbrush habitat. Because many of the existing sagebrush canopies are dense (up to 30% in some areas) and in continuous blocks, fire would easily and quickly carry into these habitats as well. Sagebrush and rabbitbrush, because of their woody volume and high volatile oil content, can generate and sustain intense fire, and contribute wind-carried debris. Due to vegetation types, structure and density, along with prevailing winds, slope, and proximity to structures, trails, and human activity areas, the result of a wildfire would cause a high risk to visitor safety (from flames and smoke) and damage and/or loss of existing facilities, in addition to broad-scale and uniform vegetation loss.

##### *Vegetation and Other Natural Resources*

See the discussion under the “Natural Diversity” effects analysis.

##### *Human Health and Safety*

A wildfire ignited within the planning area would begin without warning and spread quickly, posing a risk from smoke and flames to people and structures. Although evacuation procedures would be employed immediately, depending on the location and movement of the fire, people using the trail system may have difficulty in reaching designated safety zones. The smoke produced from a wildfire is generally unpredictable and unmanageable (at least until

the fire is suppressed). The immediate and direct impacts would be to air quality and visibility, potentially affecting the health and evacuation process for people within the planning area. Depending on wind direction, smoke could be carried into Baker Valley (approximately 2 miles to the west), contributing impacts to human health within this urban area.

### Cumulative Effects

In the event of a wildfire, depending on the severity or intensity of the fires, recovery of natural vegetation and microbotic crusts may be hindered. This would provide opportunity for exotic and noxious weeds to aggressively invade these disturbed areas. This alteration to the vegetation community would negatively impact visual resource for 1-15+ years, depending on original plant and microbotic crust composition and rates of recovery. Although any fire may expose the Oregon Trail ruts, making them more visible to the public, access to the ruts may require restriction so soils and vegetation can recover adequately to support foot traffic.

If wildfire escaped onto adjoining lands, there may be a cumulative effect to grazing activities: curtailment of grazing for several growing seasons would be required on public lands. Cumulative effects from smoke and other aspects of a wildfire would be short term, isolated, and not likely to contribute to any other actions within the vicinity of the planning areas. Impacts to other resources are addressed elsewhere in this EA.

## **Wildlife Habitat**

### Direct and Indirect Effects

Wildlife use of the area would continue at its current levels. Sage grouse would use the area sparingly and big game would use those areas that would provide the best forage and cover conditions. Those wildlife species that are currently using the planning area would continue to use the planning area barring any catastrophic events (i.e. wildfire) or increased use of the area by visiting public. Sagebrush cover for sage grouse and other small animal species would continue to increase in volume and density. This increase would preclude wildlife species associated with open sagebrush/grass communities from using the planning area extensively. Wildlife species that use heavy sagebrush communities with understory vegetation would have suitable habitat in the planning area.

As the density of vegetation continues to increase in the planning area, the possibility of a catastrophic wildfire occurring increases. An uncontrolled fire throughout the planning area would eliminate much of the sagebrush habitat. Wildlife associated with moderate to high sagebrush cover and densities would be eliminated from the area and those wildlife species that are associated with grass/forb vegetation communities would increase. Wildlife species abundance and composition would change, with the possibility of a smaller number of species occurring in the area, but a species composition that favors grass/forb communities would

dominate.

If the vegetation in the planning area continues to increase without reduction due to wildfire or other events, wildlife species composition in the planning area would remain the same and species abundance would increase for those wildlife species that are associated with sagebrush-dominated communities.

### Cumulative Effects

Because of the great amount and distribution of sagebrush vegetation communities in the surrounding geographic area, there would be little or no cumulative effects to wildlife species located in the area. Wildlife species would continue to use the area, with the potential of higher use, as surrounding private land is intensively managed for livestock grazing. Wildlife species associated with undisturbed natural sagebrush communities would move from the disturbed areas to the planning area.

If, however, a wildfire starts during the driest, hottest time of the year within the planning area, the potential for a larger scale wildfire that would consume many thousands of acres becomes high. This would eliminate a much larger percentage of sagebrush vegetation communities located within the geographic area. Depending on the extent and severity of the wildfire, wildlife species within the geographic area would change in diversity and abundance.

## **Natural Diversity**

### Direct and Indirect Effects

Vegetation density and species composition would be intensively managed by mechanical means, primarily mowing and cutting and removal of brush and tall grass, only in the immediate vicinity of Unit 8, and selectively within 30 feet of walking trails. Some planting of selected low-growth form native species would be used in the same areas to replace exotic and noxious weeds. Chemical treatment would be limited to noxious weed control throughout the Center grounds.

Outside of Unit 8, vegetation density and species composition would change over time with continued increase of grass in the interstices between sagebrush plants, and less visible increases in species complexity and extent of microbiotic crusts unless a wildfire event occurs. Maturation of sagebrush would increase average structural height and canopy coverage of that species. Over the next 20 years, old-growth sagebrush would develop in Units 3,4,5, and 7, and an increasing component of decadent old and dead sagebrush would become visible in Units 3 and 7.

Biomass would accumulate both as fine herbaceous litter and larger, more persistent woody branches. Unless reclassified as noxious, exotic species such as cheatgrass, pepperweed,

and mullein, would not be reduced in extent and could spread into any microsites subject to disturbance. Secar bluebunch wheatgrass stands now established on reclaimed trails and roadsides would continue to expand out into native rangeland, possibly hybridizing with the wild strains of wheatgrass and altering the ecological balance. After a wildfire event, species composition would be dramatically altered as described below.

### Wildfire Effects on Vegetation

A wildfire in the planning area would likely have ecological impacts ranging from a moderate to a high fire severity level. These types of fires have direct negative impacts on vegetation (increased mortality levels), microbotic crusts, and soil biological organisms. Depending on the fire severity, seeds lying on or within the soil profile (seed bank material) may be killed. The soil itself may be left completely exposed to the elements (wind, rain, and snowmelt) for several years, unless re-seeding or other treatment methods follow the fire. A high severity fire would impact water infiltration, retention, and runoff, leading to immediate and future erosion problems (Debano et al. 1998). A wildfire may not be confined within the boundaries of the planning area, but may spread into adjoining habitat, especially to the north and east.

Risk of expanded noxious weed populations and necessary control efforts would be increased, particularly since many of these species are more resistant to severe fire conditions and more rapidly invade severely disturbed sites than native species.

Over the long term, species composition and density would probably be dramatically altered by an unplanned wildfire event. The extent, density, and volume of woody material accumulated in sagebrush-dominated sites, as well as the timing and weather during the event, would influence the results. After such an event, plant communities would appear much more uniform than at present, and would be dominated by Idaho fescue grassland.

Sagebrush components would be small and widely scattered, probably composing less than 5 percent of the canopy throughout the planning area for the subsequent 15-20 years. Remaining sagebrush would mostly be restricted to rocky hillside sites. High-intensity fire would tend to reduce the native grass components for 5-10 years as well.

Native and exotic annual species would increase in extent until perennial grasses recovered. Spring wildflower displays would be greatly increased from 3-10 years after the fire event. Rubber rabbitbrush would probably increase dramatically, particularly in areas subject to high-intensity fire. Microbotic crusts would be reduced in complexity, dominated mostly by moss and algae species for 5-15 years, or even completely eliminated during that time by high fire intensities.

### Cumulative Effects

Appearance of change to vegetation communities would be minimized over the short term

compared to other alternatives, with the likelihood of dramatic, extreme modification over the long term. In the event of a wildfire, risks of extreme fire behavior and severe fire intensity would be greater than under any of the action alternatives. As a result, recovery of natural vegetation and microbiotic crusts would be more likely to take longer periods of time. Landscape alteration would more severely impact visual resources for longer periods of time (5-15+ years) than using prescribed fire under the other alternatives.

Within 10-15 years after a wildfire event, the landscape and vegetation communities would probably appear similar to the potential natural community (PNC) descriptions on most sites, except for an unusually high component of rubber rabbitbrush, which could become dominant on some sites. The introduced cultivar, Secar bluebunch wheatgrass, would be likely to expand out into, and possibly dominate some native Idaho fescue sites. While the scale of modification would be similar to Alternative D, there would likely be less variety in plant community seral stages between sites than under any other alternative, because it would be extremely difficult to preserve any substantial sagebrush components in areas burned during an unplanned wildfire event. Costs of noxious weed treatment would probably be greater than any other alternative because of the greater extent of ground impacted by high fire intensities.

If wildfire escaped onto adjoining lands, there may be a cumulative effect to grazing activities: curtailment of grazing for several growing seasons would be required on public lands to facilitate recovery of native vegetation. Impacts to other resources are addressed elsewhere in this EA.

## **Public Education and Natural History Interpretation**

### Direct and Indirect Effects

Intensive vegetation and species composition would be intensively managed (mechanically) only in the immediate vicinity of Unit 8, and selectively near the walking trails. Planting and noxious weed control would be directed to manage the vegetation cover so that it would generate a low flame intensity and shorter flame lengths, not necessarily to present the appearance of early historic vegetation.

Outside of Unit 8, no intensive management of vegetation would occur for natural history interpretation purposes. Vegetation density and species composition would change over time as described above.

For the short-term, maturation of sagebrush would increase the appearance of uniform landscape dominance of that species throughout the planning area as described above. While the early emigrants were certainly exposed to extensive vistas dominated by sagebrush along the Oregon Trail, the Interpretive Center grounds would have limited opportunity to provide interpretive and educational material regarding other components of the sagebrush/grassland ecosystem.



Unless reclassified as noxious, exotic species such as cheatgrass, pepperweed, and mullein, would not be reduced in extent and could spread into any microsites subject to disturbance. Secar bluebunch wheatgrass stands now established on reclaimed trails and roadsides would continue to expand out into native rangeland, possibly hybridizing with the wild strains of wheatgrass and altering the ecological balance. Visitors would still observe portions of the landscape in a completely unnatural condition dominated by seeded or exotic species and with a limited diversity of native species. These would be particularly prominent from access roads and portions of the Oregon Trail and the Ascent hiking trail.

Over the long term, species composition and density would probably be dramatically altered by an unplanned wildfire event as described above. After such an event, plant communities would appear much more uniform than at present, and would be dominated by Idaho fescue grassland. Sagebrush components would be small and widely scattered, providing little opportunity for interpretation of that part of the ecosystem. Exotic species and rubber rabbitbrush would increase in extent, adding unnatural elements to the appearance of the landscape. Spring wildflower displays would be greatly increased from 3 - 10 years after the fire event, providing a special but relatively short-duration interpretive opportunity.

### Cumulative Effects

Achievement of interpretive objectives for vegetation communities and landscape would be more limited for both the short-term and long-term time frames compared to other alternatives. With the likelihood of dramatic, extreme modification of the landscape over the long term, the emphasis of ecosystem and natural history interpretation would need to shift. Off-site interpretation may become more important for public education about the sagebrush/grassland ecosystem. While the scale of landscape modification would be similar to Alternative D, there would likely be less opportunity to interpret a variety of plant community types at one time than under any other alternative, because it would be extremely difficult to preserve any substantial sagebrush components in areas burned during an unplanned wildfire event. Because of the lack of an aggressive program to remove exotic species and seeded cultivars and restore native plant communities, this alternative would achieve the least progress toward the goal of eliminating unnatural vegetation components from the interpretive setting.

Under all action alternatives, plans would be developed targeting natural and cultural landscapes from the emigrant's point of view. The proposed "Interpreting the Landscape at NHOTIC" plan would utilize signs, viewpoints, and interpretive talks/hikes. The public would see plant communities more closely resembling those the emigrants encountered as they traveled through the site. Signs would be developed which would explain pioneer and Native American uses of some of the plants and identify plants. A garden may be developed to display plants visitors may look for along the trails. This garden may also provide seed for packaging and distribution to the public, or for re-seeding the landscape.

For a year or two following any burning, a blackened area would be visible to the public. There would be opportunities to interpret the scenario through photos, videos, and signs posted at strategic points. Signs would also point out any changes noted to animal distributions/populations due to the change to pioneer plant species (if any).

## **Oregon Trail Ruts**

### Direct and Indirect Effects

Vegetation would continue to encroach on the wagon trail ruts, tending to obscure them from the public.

### Cumulative Effects

Unless the ruts were used, over the long term the ruts would tend to disappear from the landscape.

## **Alternative B - Proposed Action**

### **Public Safety**

#### Direct and Indirect Effects

Up to 250 acres would be burned within the first five years of implementation, with the remainder of the planning area burned over the next 20-30 years. After 20 years, fire used to manage vegetation in the planning area would mimic historic fire regimes of 25-75 year intervals (USDA 1996). All prescribed burning would be conducted under specific weather and resource conditions, and at a time of year to ensure the intensity of the burn itself remains low to moderate. Prescribed burning would increase the particulate matter and gasses in the atmosphere for the duration of the burn and would likely cause a short-term reduction in visibility. However, prescribed fire would be controlled so that impacts from flames, smoke, and visibility are minimized. All burns would be conducted to ensure visitor, employee and firefighter safety.

Should a prescribed fire become an escaped fire (uncontrolled), there is a chance that all acres within the planning area would be consumed. The results could be similar to those described for a wildfire event under Alternative A. However, public safety would be reduced due to safeguards taken prior to initial ignition.

The loss of vegetation and vegetative matter in the surface horizon would subject the soils to wind and water erosion. Burning could cause the loss of some soil micro-organisms, vegetative matter, and soil nutrients, but low to moderate intensity fires are less likely to result

in long-term resource damage when compared to high-intensity wildfires.

### Cumulative Effects

Cumulative effects from smoke and other aspects of a prescribed burn would be short term, isolated, and not likely to contribute to any other actions within the vicinity of the planning area. Impacts to other resources are addressed elsewhere in this EA.

## **Wildlife Habitat**

### Direct and Indirect Effects

Under this alternative, approximately 208 acres of the sagebrush habitat would be treated in the planning area each treatment cycle (within 1 to 5 years). Of the approximately 208 acres treated, approximately 62 acres will be managed to retain a canopy cover of 15% to 20%. Therefore, only 146 acres will be treated with prescribed fire to reduce sagebrush densities and cover below 15%. Reducing the amount of sagebrush in the area 146 acres or more each treatment cycle (not including the treatments associated with the trails, roads, and buildings), would immediately displace those individual animals located within the prescribed fire units. This loss of habitat for high density sagebrush-dependent wildlife species is relatively insignificant because of the approximately 2,000,000 acres of similar habitat surrounding the planning area. This equates to an approximate loss of 0.007 percent of sagebrush habitat within the geographic area.

The next treatment cycle will occur within 5 to 10 years. This treatment will again use prescribed fire to treat approximately 146 acres of the 207 acres of sagebrush habitat that remained following the first treatment. As with the first treatment, approximately 61 acres within the 207 acres will be managed to retain sagebrush canopy cover at 15% to 20% levels.

Wildlife species within the planning area would be immediately displaced by the prescribed fire. This displacement could occur over the entire acreage that will be burned all at once or over a 5-year period, depending on the timing of prescribed burns. Because of different fire intensities within each prescribed fire unit and between prescribed fire units, sagebrush cover would be reduced differently. Areas that had larger reductions in sagebrush cover would cause individual animals dependent on higher percentages of sagebrush to move to other locations within or outside of the planning area. This would cause a short-term exposure of these animals to predation and the possibility of not relocating due to already occupied sites or lack of suitable sites available. Sagebrush densities and percent cover would slowly increase over the next 50 years to current or near current levels. Because only 146 acres, or 35%, of the sagebrush habitat in the planning area will be burned at any given time, wildlife species that will be displaced by the treatment will have adequate cover available within the planning area for hiding cover. If all 146 acres are burned during the first year of the first fire treatment cycle, and all of the other 146 acres is burned early in the next treatment cycle, there

will still remain approximately 123 acres of sagebrush habitat within the planning area in cover percentage adequate to provide hiding cover and protection.

An immediate reduction in the amount of grasses available to wild ungulates would occur on 146 acres and certain wildlife species may avoid the planning area. This would be a short-term loss, as grass would re-sprout the following growing season. With the reduction of sagebrush in these areas, the competition to the grasses by sagebrush would be reduced and a more expansive grass/forb vegetation community would result. Thus, in the long term, there would be an increased use of the planning area by wild ungulates because of the amount and quality of the available forage. This increase would continue until sagebrush or other shrub species reached densities which would out-compete the grass and forbs in the area.

Immediately and in the long term, an increase in the diversity and numbers of wildlife species would occur in the planning area with the increase in diversity of vegetation communities. As grass/forb vegetation communities become more established in the planning area, wildlife species that are associated with these habitat types would become more common and abundant on the planning area.

As forage increases for deer in the area, the number of deer using the planning area would increase. Deer traveling to and from foraging locations within the planning area would cross the highway near the planning area and would increase wildlife/vehicle accidents along Highway 86 near the planning area.

### Cumulative Effects

Generally, because of the small acreage of the planning area and the smaller acreage that is planned for prescribed fire relative to the large acreage of sagebrush vegetation communities in the geographic area, the cumulative effects to wildlife from this action would be insignificant. Without similar events or actions occurring in the geographic area on a large scale, there would be no measurable change in the habitat in the geographic area and effects to wildlife within the geographic area would be minimal.

## **Natural Diversity**

### Direct and Indirect Effects

Vegetation species composition and density would be intensively managed by mechanical means in the immediate vicinity of Unit 8, and selectively within 30 feet of walking trails. Chemical treatment would be used for noxious weeds and limited control of other exotic species throughout the Center grounds. Exotic species such as cheatgrass, mullein, and pepperweed would be more aggressively reduced by mechanical means and planting of native species around trails and visitor facilities, and progressively farther out on the Interpretive Center grounds than under the No-Action Alternative. Prescribed fire would be

initiated on approximately 250 acres within the planning area. Retaining approximately 30% of that acreage with a sagebrush canopy density of 15% or greater. Approximately 70% of the treated acreage would have sagebrush canopy densities ranging from 0 to 8%.

Where prescribed fire is applied and carries through the vegetation, herbaceous and woody plant growth would be reduced. Average vegetation height, volume, and density would decrease over the long term, with a reduction in canopy cover of sagebrush. Young sagebrush would re-establish on the burned habitats, requiring from 15 - 50 years to regain former densities. Depending on localized fire intensity, native grasses may maintain their present density or decrease slightly for 3 - 5 years, then become more dominant over time. Herbaceous litter would return to former levels within 3-5 years, while woody material would not be generated again until sagebrush matures and dies. Wildflower densities would increase and probably peak from 5 to 7 years after the fire. On burned sites, microbiotic crust density would decrease in the short term, with a shift toward species dominance by mosses. Where native plants are already reduced and may not re-establish well after burning, other methods would be used to re-introduce them (seeding, planting).

In portions of the planning area not subjected to prescribed fire, and in portions of the prescribed fire units which do not burn cleanly, vegetation height, volume, and density would continue to increase over time unless a wildfire event occurs. Maturation of sagebrush would accumulate additional biomass in larger diameter wood. Species composition would change with continued increase of grass in the interstices between sagebrush, which would also generate an increase in herbaceous litter. Old-growth sagebrush would develop in parts of Units 3, 4, 5, and 7, and a component of decadent old and dead sagebrush would become visible in Units 3 and 7 (about 120 acres less than Alternative A). Microbiotic crust density and species diversity would increase without fire, with a shift toward more lichens and less moss.

### Cumulative Effects

Appearance of change to vegetation communities would be greater over the short term compared to Alternatives A and C, and less than under Alternative D. The likelihood of dramatic, extreme modification over the long term would be less than for Alternative A and C. Prescribed fire would impact visual resources (noticeable signs of burned vegetation) for about 3 - 5 years after the burn.

Within 3 to 5 years after prescribed fire, the vegetation communities on that portion of the landscape would probably appear similar to the potential natural community descriptions, although recovery of microbiotic crusts would be expected to take 7 - 10 years. Follow-up mechanical and or chemical treatment and planting of native species would reduce present concentrations of exotic species and prevent extensive spread of rubber rabbitbrush. Patches of the introduced cultivar, Secar bluebunch wheatgrass, would be systematically removed and replaced with a mix of native species typical of the local Idaho fescue grassland.

The resulting intentional landscape modification would be about half that under Alternative D, and twice the acreage under Alternative C. Over the first 30 years, there would likely be more variety in plant community seral stage between sites than under any other alternative. Natural seeding and maturation of established sagebrush would result in the appearance of increased density and dominance of that species on approximately half the planning area over a 25-year period after plan implementation, while vegetation on the other half would achieve the aspect of Idaho fescue-dominated grassland with scattered remnants and patches of brush. There would be more open grassland than under Alternative C, and more sagebrush than under Alternative D. In the event of a subsequent unplanned wildfire, the spread of fire back through the habitat that had already been burned would be less severe, and would be more likely to leave a mosaic of sagebrush intermixed with grassland than in previously unburned areas. There would be fewer areas of sterilized soil, and less difficulty in controlling noxious weeds or exotic species. Half the planning unit would still be at risk of wildfire impacts similar to those described under Alternative A.

If prescribed fire escaped onto adjoining lands, there may be similar cumulative effects to grazing activities as described for Alternative A, although risks of this occurrence would be much lower due to the initial presence of fire crews and equipment and methods of prescribed fire implementation

## **Public Education and Natural History Interpretation**

### Direct and Indirect Effects

Vegetation density and species composition would be intensively managed in the immediate vicinity of Unit 8, and selectively within 30 feet of walking trails. While this activity would result in a reduction in exotic species close to trails, the primary objective would be to eliminate noxious weeds and achieve a vegetation cover that would generate low flame intensity and shorter flame lengths, not necessarily to present the appearance of early historic vegetation.

Outside of Unit 8, intensive management of vegetation would occur for natural history interpretation purposes as well as public safety goals. Vegetation density and species composition would change over time as described in the “Natural Diversity” section above.

Patches of disturbed habitat with highly visible infestations of exotic species such as cheatgrass, pepperweed, and mullein, would be intensively managed to restore a mix of native species. Secar bluebunch wheatgrass now established on reclaimed trails and roadsides would be systematically removed and replaced with native species over time. Visitors would still observe portions of the landscape in unnatural condition dominated by seeded or exotic species, particularly from access roads, but these would be restored with native species over a 20-year period.

Over the long term, the landscape at the Interpretive Center would be dominated by open

grassland (70%) and retain a substantial component of sagebrush-dominated sites (30%). There would be a greater variety of conditions of ecological succession and plant community seral stages to provide interpretive opportunities than under Alternative A and D, and a similar variety compared to Alternative C. Plant communities at the Center would more closely approximate potential natural plant community descriptions and conditions of the local landscape as the early emigrants would have seen them, although the size of areas burned at one time would probably be smaller. Over the next 20 - 30 years, establishment and maturation of sagebrush on the prescribed burn area would provide replacement of that habitat type to compensate for reduction of sagebrush on other sites as those are subjected to prescribed fire.

### Cumulative Effects

Achievement of interpretive objectives for vegetation communities and landscape would be optimized for both the short-term and long-term time frames compared to other alternatives. With an aggressive program to remove exotic species and seeded cultivars and restore native plant communities, this alternative would achieve progress toward the goal of eliminating unnatural vegetation components from the interpretive setting. Because the effort to remove exotic species would be partly dependent on the timing and application of prescribed fire, this alternative would achieve that progress more quickly than under Alternative C, and more slowly than under Alternative D.

## **Oregon Trail Ruts**

### Direct and Indirect Effects

Plants which have encroached on the ruts may be removed through hand-pulling, spraying, or mechanical means. Ruts may be used for wagon trail re-enactments. The re-enactments may include small cattle drives. Brush and other plants would be kept small and low, representing the impacts of being constantly driven upon. Effects of weathering would also be counteracted if wagons are occasionally driven on the trail.

### Cumulative Effects

Over time, funding would be invested in the maintenance of the ruts.

## **Alternative C**

### **Public Safety**

#### Direct and Indirect Effects

From 75-90 acres would be burned every 10 to 15 years, until all 500 acres within the planning area have been treated with prescribed fire. After 40 years, fire used to manage vegetation in the planning area would mimic historic fire regimes of 25-75-year intervals (USDA 1996). The effects of implementing this alternative on public safety would be similar to those described under Alternative B, except the risk from prescribed fire would be spread across a longer period of time on smaller blocks of land. Up to 75 acres around roads, trails, buildings, and public activity areas would be treated and maintained at very low sagebrush density levels (0-5%).

#### Cumulative Effects

Same as described under Alternative B.

### **Wildlife Habitat**

#### Direct and Indirect Effects

Under this alternative, approximately 83 acres of the sagebrush habitat would be treated within the planning area every 10 years. As under Alternative B, there will be approximately 30% of the sagebrush habitat within the planning area in the 15% to 20% cover levels. Alternative C is different from Alternative B in that diversity of the habitat would increase over the course of time. As each treatment cycle burns approximately 83 acres of sagebrush habitat to reduce the cover to near 0%, this will provide habitat for those wildlife species associated with grass/forb habitats. Each successive treatment cycle will burn 83 acres of sagebrush habitat to near 0% cover levels. However, the previous burned area will have recovered and sagebrush cover levels would be in the 5% to 8% levels.

The next treatment will reduce another 83 acres of sagebrush habitat to near 0% cover levels, however, the first treatment area will have recovered to near 8% to 12% cover levels and the second treatment area will have recovered to near 5% to 8% cover levels. When the final treatment area is treated in approximately year 40 there will be approximately 83 acres (20%) of 0-5 % sagebrush cover, 83 acres of 5% to 8% sagebrush cover, 83 acres of 8%-12% sagebrush cover, 83 acres of 12% - 15% sagebrush cover, and 83 acres of greater than 15% sagebrush cover within the planning area. This provides a diversity of sagebrush cover in the planning area that will cater to many species of wildlife.



Immediate effects to wildlife would include the loss or modification of sagebrush vegetation communities on approximately 83 acres. This is a minor amount of habitat loss considering the vast expanse of sagebrush vegetation communities surrounding the planning area. This change in vegetation would affect wildlife similar to Alternative B, but would affect fewer individual animals with the smaller amount of acreage that will be treated.

As under Alternative B, there would be an immediate loss of grass and forbs in the treatment units, decreasing the amount of forage available for deer for a short period of time. However, the amount of forage available to wild ungulates in the area would increase following a growing season. Thus, the number of deer using the planning area would increase. This would also cause an increase in the vehicle/deer collisions along Highway 86 near the planning area.

### Cumulative Effects

The cumulative effects to wildlife from actions under Alternative C are similar to those described under Alternative B. With approximately 415 acres of sagebrush habitat under treatment in the planning area over the course of 40 years, cumulative impacts would be minimal as vegetation from each 83-acre treatment re-establishes itself to provide a diverse array of sagebrush vegetation community components.

## **Natural Diversity**

### Direct and Indirect Effects

Vegetation in the immediate vicinity of Unit 8, and selectively near walking trails and access roads would be managed the same as under Alternative B. Approximately 15 additional acres between access roads would be intensively treated to reduce sagebrush densities and fuels. Prescribed fire would be initiated on approximately 75-90 acres within the planning area in the first 5 years. Fire prescriptions would intentionally reduce sagebrush densities to very low levels (0-5%) within treatment areas.

Results of management would be similar to those described under Alternative B, except that more (100 - 150 acres) of the habitat would remain untreated for an additional 10 - 15 years. Between year 30 and 40 after plan implementation, results of management on structure and composition of vegetation communities would become nearly identical between Alternatives C and B, although sagebrush in the smaller prescribed fire units under Alternative C would tend to be more uniform in size and age class than under Alternative B.

### Cumulative Effects

Appearance of change to vegetation communities would be greater over the short term compared to Alternative A, and less than Alternatives B and D. The likelihood of dramatic, extreme habitat modification due to wildfire over the long term would be less than under Alternative A, but more than under Alternatives B or D. Prescribed fire would impact visual resources (noticeable signs of burned vegetation) for about 3 - 5 years after the burn.

The resulting initial landscape modification would be about half that under Alternative B, and one-quarter the acreage of Alternative C. Natural seeding and maturation of established sagebrush would result in the appearance of increased density and dominance of that species on approximately 75 - 80 percent of the planning area over a 20-year period after plan implementation, while vegetation on the remainder would achieve the aspect of Idaho fescue-dominated grassland with scattered remnants of brush. Because of the small size of the prescribed fire treatment areas, sagebrush habitat retention would be minimal within the units, but would recover and mature over an average 50 year period before retreatment.

Over the long term, a landscape mosaic of habitat types would be achieved between prescribed fire treatment units rather than within the units. In the event of a subsequent unplanned wildfire, the spread of fire back through the habitat that had already been burned would be less intense, and more likely to leave a light scattering of sagebrush intermixed with grassland than in previously unburned areas. About 75 - 80 percent of the planning unit would still be at risk of wildfire impacts similar to those described under Alternative A during the first 15 years, and up to 50 percent would be at risk for 25 - 30 years.

If prescribed fire escapes onto adjoining lands, there may be similar cumulative effects to grazing activities as described under Alternative A, although risks of this occurrence would be much lower due to the initial presence of fire crews and equipment and methods of prescribed fire implementation

## **Public Education and Natural History Interpretation**

### Direct and Indirect Effects

Over the first 20 - 30 years, increases in sagebrush densities along the Oregon Trail and the more remote portions (in relation to the center buildings) of the planning area would present a landscape distinctly different from the historic setting of the early emigrant period. Occasional burning would represent wildfire effects that the emigrants saw on other portions of the Trail in eastern Oregon, although the scale of landscape affected would probably be much smaller than seen in a natural wildfire event.

Vegetation density and species composition would change over time as described in the "Natural Diversity" section above, and would be similar to results under Alternative B except for the use of smaller prescribed fire treatments implemented on a 10 - 15 year schedule.

### Cumulative Effects

Over the long term, the landscape at the Interpretive Center would be about equally divided between open grassland and sagebrush-dominated sites similar to results under Alternative B. There would be a greater variety of conditions of ecological succession and plant community seral stages to provide interpretive opportunities than under Alternatives A and D, and a similar variety compared to Alternative B. Ecological succession and seral stage plant communities within individual prescribed fire units would be more unnaturally uniform in appearance than under Alternative B or D. Plant communities at the Center would appear similar to landscape conditions the early emigrants would have seen, although the size of areas burned at one time would be much smaller.

Opportunities for interpretation of a full range of vegetation communities and landscape components would be present at the Interpretive Center grounds in contrast to Alternatives A and D, but at a somewhat less realistic scale and with more obviously unnatural contrast between and lack of diversity within treatment units than under Alternative B. This alternative would progress toward the goal of eliminating exotic species from the interpretive setting, but being partly dependent on the timing and application of prescribed fire, that progress would happen more slowly than under Alternatives B and D.

## **Oregon Trail Ruts**

### Direct and Indirect Effects

Same as under Alternative B, except costs of maintenance of the ruts would probably be higher and require more manual labor than under either of the other action alternatives. Vegetation would be removed through fire and the ruts may be less visible in the short term. Following recovery from burning, grass would likely seed in and the trails would contrast more vividly with the surrounding sagebrush component.

### Cumulative Effects

Over time an effort would be made to encourage grass rather than shrubs to grow in the ruts. This would ensure a visual contrast for future generations to easily distinguish the trail on the landscape.

## **Alternative D**

### **Public Safety**

#### Direct and Indirect Effects

Under this alternative, prescribed fire would be applied to 500 acres during the first five years of project implementation. The effects of implementation would be similar to Alternative B, except the risk to public safety would be concentrated in a shorter time period and on a larger (twice the size) block of land. Under this alternative, risk of wildfire would be further reduced, and therefore the risk to public safety would be reduced, because hazardous fuels would be more quickly reduced than under Alternative B or C.

#### Cumulative Effects

Same as described under Alternative B.

### **Wildlife Habitat**

Under this alternative, all 415 acres of sagebrush habitat would be treated within the planning area within 1 to 5 years. As under Alternatives B and C, approximately 30% of the habitat will be managed to retain sagebrush cover in the 15% to 20% levels over the entire planning area. This equates to approximately 125 acres. Direct and indirect effects to wildlife from actions under Alternative D are similar to Alternatives B and C, except for the amount of sagebrush habitat that will be modified or eliminated, and the time under which these changes will occur. An immediate impact will occur to wildlife in the entire planning area. With the short time frame in which all the planning area will be treated, there is not expected to be a period in which any area will recover to pre-treatment sagebrush cover levels. This would cause an immediate decrease of most wildlife in the planning area, including sage grouse and pygmy rabbits, through emigration and habitat loss.

The number of wildlife species that are grass/forb-dependent would increase. As under the other alternatives, there would be an immediate loss of grass and forbs throughout the planning area, decreasing the amount of forage available for deer for a short period of time. However, the amount of forage available to wild ungulates in the area would increase following a growing season, and would be greater than under the other alternatives. Grass/forb vegetation would establish itself on approximately 290 acres. Thus, the number of deer using the planning area would increase. This would also cause an increase in the vehicle/deer collisions along Highway 86 near the planning area. By eliminating or modifying most of the sagebrush habitat within the planning area within a 5-year period, a travel or migration corridor for wildlife would be eliminated in the planning area. A decrease in the use of the planning area by wildlife dependent upon sagebrush for cover and protection would occur for a period

of approximately 30 to 50 years.

Cumulative effects from Alternative D are similar to Alternatives B and C, in that habitat loss or modification within the planning area is minor relative to the amount of sagebrush habitat surrounding the planning area.

## **Natural Diversity**

### Direct and Indirect Effects

Vegetation in the immediate vicinity of Unit 8, and selectively within 30 feet of walking trails would be managed the same as under Alternative B. Prescribed fire would be initiated on all acres within the planning area outside of Unit 8 in the first 5 years, retaining approximately 30% of that acreage with a sagebrush canopy density of 15% or greater. Approximately 70% of the treated acreage would have sagebrush canopy densities ranging from 0-8%.

Results of management would be similar to those described under Alternative B for the prescribed burn habitat, except that almost twice as much habitat would be treated within the first 5 years. Between year 5 and 30, this alternative would retain less sagebrush cover than any of the other alternatives, except in case of a wildfire event. Old-growth sagebrush would be a minor habitat component. Young, vigorously growing sagebrush would outnumber old plants over the next 30 years. In 30 - 50 years, sagebrush would likely recover to 10 - 15 percent canopy cover over most portions of the planning area not subjected to additional prescribed fire treatments or wildfire. Prescribed fire could be re-initiated on all or portions of the planning area as soon as 25 years after the initial treatment if needed to meet public safety objectives.

### Cumulative Effects

Appearance of change to vegetation communities would be greater over the short term than any other alternative except in the event of a wildfire. The resulting initial landscape modification would be about twice that under Alternative B, and four times the acreage under Alternative C. (Approximately 30% of the landscape would be covered with patches of dominant sagebrush. The remainder would appear as open grassland with scattered individuals and clumps of sagebrush.

A wildfire event which occurred after initial treatment would further reduce sagebrush cover, but would probably produce a mosaic burn pattern and distribution of sagebrush patches similar to the prescribed fire. Only habitat dominated by dense residual patches of sagebrush would still be at risk of severe wildfire impacts similar to those described under Alternative A.

If prescribed fire escaped onto adjoining lands, there may be similar cumulative effects to grazing activities as described under Alternative A, although risks of this occurrence would be

much lower due to the initial presence of fire crews and equipment and methods of prescribed fire implementation.

## **Public Education and Natural History Interpretation**

### Direct and Indirect Effects

Vegetation density and species composition would be similar to that described for the prescribed burn portion under Alternative B, only covering the entire grounds of NHOTIC.

### Cumulative Effects

Over the long term, about 70% of the landscape at the Interpretive Center would appear as open grassland sites with a component of scattered clumps and individual sagebrush. Approximately 30% of the 500 acre landscape would be dominated by sagebrush in patches. There would be less variety of conditions of ecological succession and plant community seral stages to provide interpretive opportunities than under Alternative B or C. Plant communities at the Center would more closely approximate potential natural plant community descriptions and conditions of the local landscape as the early emigrants would have seen them. Burning and visible evidence of burned habitat would represent wildfire effects that the emigrants saw on other portions of the Trail in eastern Oregon, although seasonal time frames might not coincide, and would be compressed into one to five years. Over the next 20 - 30 years, establishment and maturation of sagebrush on the prescribed burn area would provide replacement of that habitat type to compensate for reduction of sagebrush on other sites outside the immediate planning area, as those are also subjected to prescribed fire.

Opportunities for interpretation of a full range of vegetation communities and landscape would be limited to two seral stage components represented by pockets of a mature/old sagebrush and an extensive uniformly aged grassland/brush site, but landscape mosaic would be similar to the prescribed fire treatment units described under Alternative B. This alternative would make the most rapid progress and require greater initial investment in eliminating exotic species from the interpretive setting, because the best results could be obtained by follow-up treatments within one year of application of prescribed fire.

## **Oregon Trail Ruts**

### Direct and Indirect Effects

Same as under Alternative B, except costs of maintenance activities for the ruts would be minimized because of the rapid implementation of prescribed fire to reduce brush invasion in the vicinity of the Oregon Trail ruts.

### Cumulative Effects

Same as under Alternative C.

## **Additional Effect/Disclosures**

The NEPA process for the Bureau of Land Management requires that certain “critical elements” be considered in the analysis process. Each of these is listed below with the expected effects described (if any).

### **Air Quality**

Air quality is usually good to excellent in the vicinity of NHOTIC. Actual implementation of proposed prescribed burns would cause temporary, short-term impacts to air quality at or near the Interpretive Center. Impacts could include particulate matter and gasses, as well as reduced visibility in the immediate area. These impacts would only occur over a 1-4 hour period and smoke would quickly disperse. To mitigate impacts, burns would be scheduled under light wind conditions (1-10 mph) from the southwest or northwest, thereby having minimal impact on Baker Valley and Baker City to the west.

### **Areas of Critical Environmental Concern (ACEC)**

NHOTIC Was designated an ACEC in the Baker RMP ROD (page 47). The actions proposed in this EA are compatible with the record of decision for the Baker RMP.

### **Cultural Resources**

Cultural resources are one of the important elements of NHOTIC, whether preserving existing ones (Oregon Trail wagon ruts, Ezra Meeker marker, railroad grade) or displaying reproductions of relevant ones (Lode Mine). The area has been extensively surveyed in the past while planning development of NHOTIC. No known sites will be destroyed.

### **Environmental Justice**

This element refers to the potential to impact a specific ethnic or economic group through the actions proposed. There is no expectation that this would occur. There are no people who live at the site, although neighbors could be affected by increased temporary effects of smoke. Persons living in the City of Baker may have the potential to be classified as an “affected group,” but there is little chance of any impacts of these proposals having a direct affect on any group. There is a potential for economic impacts to have an effect on Baker City as a whole. These types of impacts are related to the number of visitors who spend time in the area after visiting NHOTIC. There is no particular link to ethnic or economic groups.

### **Farm Lands (prime or unique)**

Lack of water is the most limiting factor on the area. None of NHOTIC has ever been considered or used as farmland in the past. Some grazing had occurred. There is no change to the acreage of farmland (prime or other) due to implementation of any of the alternatives.

### **Floodplains**

NHOTIC does not support a floodplain.

### **Invasive, Non-Native Species**

These plants are expected to be affected by all the alternatives, to a greater or lesser extent, depending on the actions involved. Exotic and noxious weeds are treated even under the No Action Alternative. Specific impacts are addressed under the “Natural Diversity” issue.

### **Native American Religious Concerns**

There is no expectation that there would be any change to these concerns. There are no known Native American religious uses of NHOTIC.

### **Threatened or Endangered Species**

There are no known species of plants listed by the Endangered Species Act within the planning area. Wildlife species are addressed under the “Wildlife Habitat” issue. There is no water present; no fish are affected.

### **Wastes, Hazardous or Solid**

No wastes would be generated by any of the alternatives. There are none currently present at the site.

### **Water Quality, Surface/Ground**

None of the alternatives would have any impact on existing water quality.

### **Wetlands/Riparian Zones**

There are none within the NHOTIC boundaries.

### **Wild and Scenic Rivers**

There are none within or adjacent to this area.

### **Wilderness**



There are none within or adjacent to this area.

## REFERENCES/LITERATURE CITED/BIBLIOGRAPHY

DeBano, L.F., D. G. Neary, P. F. Folliott. 1998. *Fire's Effects on Ecosystems*. John Wiley & Sons, Inc. March 1998.

US Department of Agriculture, Forest Service. 1996. *Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin*. General Technical Report PNW-GTR-382. Portland, OR,

See also Appendix C.

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## **APPENDIX MATERIAL**

Appendix A	Unit Description
Appendix B	Maps of Site
Appendix C	Historical Background
Appendix D	Laws, etc. Governing NHOTIC
Appendix E	Existing Condition
Appendix F	NHOTIC Plant List
Appendix G	NHOTIC Wildlife List

## APPENDIX A

### DESCRIPTION OF VEGETATION UNITS, MANAGEMENT OBJECTIVES, AND PROPOSED TREATMENTS

**Unit 1:** Southwest corner of the planning area, predominately west and northwest aspects, from ridgetop down into the swale containing the old Auburn Trail. Estimated unit size is 48 acres.

Unit 1 is visually dominated by Wyoming big sagebrush with an understory of Idaho fescue. Sagebrush density has not been sampled, but it appears there is potential to retain adequate cover for sage grouse habitat. Site is outside exclosure fence and managed under agreement to allow livestock trailing to and from adjacent allotments. Development of microbiotic crust is limited due to livestock access. Soil surface is somewhat compacted. Native grasses remain vigorous but have reduced organic litter at base compared to adjacent site within exclosure. Incidence of exotic species is low, requiring no special control efforts at this time. Site has not been fully inspected for presence of noxious weeds, but occurrence of whitetop is expected in drainage near the highway. Upland rangeland condition is good to excellent. Sagebrush densities are somewhat high, but within the range of expected variability to meet visual aspects of natural history interpretation appropriate to the period of early European immigration. Fire hazard to public visitors is low due to limited public use.

Vegetation Management Objectives: Manage vegetation in Unit 1 to assist in maintaining adequate sagebrush cover for sage grouse habitat and other ecosystem considerations over the long term, recognizing an overall management goal to reintroduce fire into the ecosystem. An estimated fire return interval of 25-75 years (USDA 1996) may be modified by future research findings. Periodically inspect for noxious weeds and treat any infestations.

Treatments:

No burning is planned in the first 15 years of implementation.  
Noxious weed treatment is planned along Highway 86 (approximately 1 acre net).  
There are opportunities to interpret the historic significance of the Auburn Trail

**Unit 2:** Southwest corner of the planning area, with predominately north aspects from ridgetop down to the Oregon Trail. Estimated unit size is 96 acres.

Unit 2 is dominated by Idaho fescue (36% cover) with a lesser overstory component of Wyoming big sagebrush. Sagebrush canopy cover is 3% (below minimum cover for sage

grouse habitat). Over the long term, there is potential to develop adequate cover for sage grouse. Unit 2 is within the livestock exclosure. Development of microbiotic crust is well advanced, with substantial growth of moss and lichen in interstices between vascular plants. Native grasses are vigorous with substantial organic litter at base. Incidence of exotic species is very low on north aspects. No noxious weeds have been observed except along the highway and the old parking site next to the highway. Rangeland condition is excellent. Sagebrush density is within the range of expected variability to meet visual aspects of natural history interpretation appropriate to the period of early European immigration. Special control efforts may be justified to suppress exotic species, to restore visual aspects for natural history interpretation and spot control of noxious weeds along the highway and old parking area. Fire hazard to public visitors is low due to limited public activity on the site except near the old parking area, which has filled in with tall cheatgrass.

Vegetation Management Objectives: Manage Unit 2 to meet visual aspects of natural history interpretation while assisting in maintenance of adequate sagebrush cover for sage grouse, recognizing an overall management goal to reintroduce fire into the ecosystem. Allow sagebrush cover to increase to a maximum 30% over the long term. An estimated fire return interval of 25-75 years (USDA 1996) may be modified by future research. Periodically inspect for noxious weeds and treat any infestations.

Treatments:

Minor acreage of prescribed burning is planned along portions of the Oregon Trail in conjunction with treatment of portions of Units 3 and 5 during the first 5 years of implementation.

Noxious weed treatment is planned along Highway 86 (approximately 1 acre).

Plant native grasses, wildflowers, and shrubs where appropriate to fill disturbed habitat or replace exotic species.

**Unit 3:** Oregon Trail and lower portions of south slopes. Estimated unit size is 90 acres.

Unit 3 is dominated by large, old Wyoming big sagebrush with a component of rubber and green rabbitbrush. Understory is highly variable, including patches of bare ground and sparse cheatgrass, low forb cover, Idaho fescue, bluebunch wheatgrass, and needle and thread grass. Sagebrush cover is 19%. Site has the potential to retain adequate cover for sage grouse habitat. Unit 3 is within the livestock exclosure. Development of microbiotic crust is moderately advanced, with some growth of moss and lichen in interstices between vascular plants. Native grasses are vigorous with substantial organic litter at base, but patchy distribution. Incidence of exotic species is high. Incidence of noxious weeds is limited to whitetop and Scotch thistle at this time. Rangeland condition is poor to fair

overall, indicating a slow recovery from recent grazing history. Sagebrush and rabbitbrush densities along the swale bottom are excessive and native grass species are less prominent than desirable for interpretive goals. Special control efforts may be justified to suppress exotic species to restore visual aspects for natural history interpretation and spot control of whitetop and Scotch thistle. Fire hazard is moderate to high depending on the number of visitors using the lower portions of the Ascent trail or walking along the Oregon Trail.

Vegetation Management Objectives: Manage Unit 3 to meet visual aspects of natural history interpretation while assisting in maintenance of adequate sagebrush cover for sage grouse, recognizing an overall management goal to reintroduce fire into the ecosystem. An estimated fire return interval of 25 to 75 years (USDA 1996) may be modified by future research. Reduce the present cover of sagebrush to 5-15% in the swale bottom near the Oregon Trail and increase native grass components. Emphasize retention of suitable winter sage grouse habitat on the south slope in the east half of the site. Restore natural visual components by replacing Secar bluebunch and exotic weeds with native plants. Reduce fuels hazards by selectively removing sagebrush and other large plants from along trails. Periodically inspect for noxious weeds and treat any infestations.

Treatments:

Prescribe burn portions of this site within 5 years, consistent with overall acreage objectives for the unit and maintenance of adequate sage grouse habitat. The remainder of this site would be burned under prescription in approximately 15 to 20 years.

Intensively manage (mechanical and/or chemical) fuels hazards and vegetation along trails.

Treat noxious weeds along Highway 86 (approximately 1 acre).

Plant native grasses, wildflowers, and shrubs where appropriate to fill disturbed habitat or replace exotic species.

**Unit 4:** Southeast corner of the planning area, south, between and east of access roads. Estimated unit size is 86 acres.

Unit 4 is visually dominated by Idaho fescue (42% canopy cover) with a lesser overstory component (12% canopy cover) of Wyoming big sagebrush. The Unit has potential to retain adequate cover for sage grouse habitat. Site is within livestock enclosure. Microbiotic crust is well developed, although small portions of the Unit are mechanically disturbed and have little or no microbiotic components. Incidence of exotic species is moderate, with the most noticeable components being yellow sweet clover and the cultivar Secar bluebunch wheatgrass. Noxious weeds are mainly limited to road edges, and are

presently being treated with chemical herbicides. Native grasses are vigorous with substantial organic litter at base. Rangeland condition is predominately good to excellent. Sagebrush density is within the range of expected variability to meet visual aspects of natural history interpretation appropriate to the period of early European immigration. Special control efforts may be justified for spot control of noxious weeds along the highway and access roads, to reduce fuel hazards near narrow curves on roads, and to restore visual aspects for natural history interpretation. Fire hazard to public visitors is generally low except at fuel concentration points near the fee booth and on curves of the access roads. Fire hazard to maintenance facilities is controlled by mowing.

Vegetation Management Objectives: Manage Unit 4 to meet visual aspects of natural history interpretation while assisting in maintenance of adequate sagebrush cover for sage grouse, recognizing an overall management goal to reintroduce fire into the ecosystem. An estimated fire return interval of 25 to 75 years (USDA 1996) may be modified by future research. Allow sagebrush to increase to no more than 20% cover before initiation of treatment to reduce fuels for public safety considerations. Restore natural visual components and reduce fuels hazards along roads by replacing Secar bluebunch and exotic weeds with native plants. Reduce fuels hazards by selectively removing sagebrush and other large plants near the fee collection booth. Periodically inspect for noxious weeds and treat any infestations.

Treatments:

Prescribed burning is planned in the first 5 years of implementation. Some acreage would be burned on the north and western portions of the Unit in conjunction with treatment of Unit 5. The remainder of the unit would be treated with prescribed fire in approximately 15 to 20 years after plan implementation. Plant native grasses, wildflowers, and shrubs where appropriate to fill disturbed habitat or replace exotic species. Treat noxious weeds along Highway 86 and at the entrance to the planning area (approximately 1 acre). Opportunities to interpret mining activity, both at Lode Mine and at active mine across the way.

**Unit 5:** Mid- to upper south slope of Flagstaff Hill below main facility parking areas, Ascent Trail, and access roads. Estimated unit size is 44 acres.

Unit 5 is visually dominated by young to medium age Wyoming big sagebrush which transitions to dominance by large old sagebrush on the lower portions of the slope. Herbaceous understory is highly variable, including patches of bare ground and sparse cheatgrass, low forb cover, Idaho fescue, bluebunch wheatgrass, and annual weeds. Sagebrush canopy cover is 24%. Site has potential to retain adequate cover for sage



grouse habitat. Site is within livestock enclosure. Development of microbiotic crust is moderately advanced, with some growth of moss and lichen in interstices between vascular plants. Native grasses are vigorous with substantial organic litter at base, but patchy distribution. Incidence of exotic species is high. Incidence of noxious weeds is limited except for whitetop and Scotch thistle, which are distributed throughout the site. Rangeland condition is fair to good overall, indicating a slow recovery from recent grazing and mining activity. Sagebrush densities are excessive and native grass species are less prominent than desirable for interpretive goals. Sagebrush densities on the upper slope portions and near the Ascent trail also present problems for public safety during wildfire events. Special control efforts are needed to suppress exotic species to restore visual aspects for natural history interpretation and for spot control of noxious weeds. Fire hazard is high because of the potential fire intensity along the Ascent Trail and potential for burning material to be transported into the parking lots by upslope winds during a fire event.

Vegetation Management Objectives: Manage Unit 5 to meet fire safety needs and visual aspects of natural history interpretation while assisting in maintenance of adequate sagebrush cover for sage grouse migration and winter range, recognizing an overall management goal to reintroduce fire into the ecosystem. An estimated fire return interval of 25 to 75 years (USDA 1996) may be modified by future research. Reduce and maintain sagebrush and rabbitbrush cover to a level from 0 -10% on the upper slope. Maintain a cover of sagebrush from 10 to 25% at midslope levels. Increase native grass components, particularly near the Ascent Trail. Restore natural visual components and reduce fuels hazards by replacing Secar bluebunch wheatgrass and exotic weeds with native plants. Reduce fuels hazards by removing sagebrush and other large plants near trails and at curves in access roads. Periodically inspect for noxious weeds and treat any infestations.

Treatments:

Prescribed burning is planned in the first 5 years of implementation. Most or all of this unit would be treated, resulting in nearly complete removal of sagebrush on the upper south slopes, and a patchy distribution of sagebrush on the midslope of Flagstaff Hill.

Intensively manage (mechanically and/or chemically) fuels hazards and vegetation along trails.

Plant native grasses, wildflowers, and shrubs where appropriate to fill disturbed habitat or replace exotic species.

Treat noxious weeds where found.

Opportunity to create additional interpretive sites along Ascent Trail and near wagon encampment.

**Unit 6:** Upper west and north aspect slopes of Flagstaff Hill below main facility, Rabbit Mine, and outdoor amphitheater. Estimated unit size is 39 acres.

Unit 6 is dominated by Idaho fescue with sparse young to medium age Wyoming big sagebrush. Sagebrush cover is between 3 to 10% overall (one patch reaches 19% cover). The Unit does not meet minimum cover requirements for sage grouse habitat. The Unit is within the livestock enclosure. Development of microbiotic crust is well advanced, with substantial growth of moss and lichen in interstices between vascular plants. Native grasses are vigorous with substantial organic litter at base and dense, uniform distribution. Incidence of exotic species is very low except near maintained trails. Incidence of noxious weeds limited to whitetop and Scotch thistle. Rangeland condition is excellent overall, indicating nearly complete recovery from recent grazing and mining activity. Sagebrush densities are within the range of expected variability to meet visual aspects for interpretive goals, but present some public safety problems near heavily used trails during wildfire events. Special control efforts are needed to suppress exotic species to restore visual aspects for natural history interpretation and for spot control of whitetop and Scotch thistle. Fire hazard is moderate to high because of the potential fire intensity along high use trails adjacent to the main facility and potential for burning material to be transported by upslope winds during a fire event.

Vegetation Management Objectives: Manage Unit 6 to maintain sagebrush and rabbitbrush cover to a level from 0-10% on the upper west and north slopes below the amphitheater, main interpretive facility, and Rabbit Mine site. Reduce fuels hazards and restore natural visual components by replacing Secar bluebunch wheatgrass and exotic annual weeds with native Idaho fescue, Sandberg bluegrass, and low-growing wildflowers along edges of trails. Reduce fuels hazards by removing Basin wild rye plants from along the edges of trails. Periodically inspect for noxious weeds and treat any infestations.

Treatment:

Prescribed burning is planned in the first 5 years of implementation. Some acreage would be burned on the east and southern portions of the site in conjunction with treatment of Unit 5. The remainder of the Unit would be treated with prescribed fire in approximately 15 to 20 years after plan implementation, or the upper slope portions may be treated sooner if necessary to maintain low sagebrush densities for public safety purposes.

Plant native grasses, wildflowers, and shrubs where appropriate to fill disturbed habitat or replace exotic species.

Treat noxious weeds where found.

**Unit 7:** West ridge and southwest slope above Ascent Trail out to Ramada overlook. Estimated unit size is 69 acres.

Unit 7 is dominated by young to medium age Wyoming big sagebrush and sparse large, old sagebrush. Idaho fescue dominates the understory on the ridge and slope. Sagebrush canopy cover is variable, but as high as 29%. Site has potential to retain adequate cover for sage grouse habitat. Site is within livestock exclosure. Development of microbiotic crust is well advanced, with substantial growth of moss and lichen in interstices between vascular plants. Native grasses are vigorous with substantial organic litter at base. Incidence of exotic species is very low except near maintained trails. Incidence of noxious weeds limited to occasional whitetop and Scotch thistle. Rangeland condition is good overall, indicating substantial recovery from recent grazing and mining activity. Sagebrush densities are higher than desirable to meet visual aspects for historic interpretive goals. Special control efforts may be justified to suppress exotic species to restore visual aspects for natural history interpretation and for spot control of whitetop and Scotch thistle. Fire hazard is moderate because of the potential fire intensity along the Ramada trail. Fire hazard reduction along edges of trails is desirable.

Vegetation Management Objectives: Manage Unit 7 to maintain sagebrush cover from 10-25% to provide winter habitat for sage grouse, recognizing an overall management goal to reintroduce fire into the ecosystem. An estimated fire return interval of 25 to 75 years (USDA 1996) may be modified by future research. Reduce fuels hazards and restore natural visual components by replacing Secar bluebunch wheatgrass and exotic annual weeds with native Idaho fescue, Sandberg bluegrass, and low-growing wildflowers along edges of trails. Reduce fuels hazards by selectively removing sagebrush and other large plants from along trails. Periodically inspect for noxious weeds and treat any infestations.

Treatment:

No prescribed burning is planned in the first 15 years of implementation. This site would be treated with prescribed fire in approximately 15-20 years after plan implementation.

Use mechanical treatment to selectively remove fuel concentrations near trails. Plant native grasses, wildflowers, and shrubs where appropriate to fill disturbed habitat or replace exotic species.

Treat noxious weeds where found.

**Unit 8:** Top of Flagstaff Hill around main facility, trails, and outdoor interpretive facilities. Estimated unit size is 19 acres.

Site is a mixture of paved and graveled surfaces, native plant communities, seeded cultivars, and heavily disturbed areas dominated by annual weeds. Vegetation is influenced by supplemental runoff from paved surfaces which encourages rapid growth, and frequent disturbance from human activity. Habitat requirements are generally not met for any wildlife species intolerant of close human presence. Development of microbiotic

crust is limited, depending on the degree to which human activity is effectively directed onto paved surfaces. Incidence of exotic species is high. Incidence of noxious weeds is high, including whitetop, Scotch thistle, and knapweed. Sagebrush and rabbitbrush densities are probably appropriate for the rocky site, but present serious problems for public safety during fire events. Special control efforts are needed to control exotic species to restore visual aspects for natural history interpretation and for spot control of noxious weeds. Fire hazard is high because of the potential fire intensity along trails and walkways, and because of the proximity of occupied buildings and large numbers of people.

Vegetation Management Objectives: Manage Unit 8 to meet fire safety needs and visual aspects of natural history interpretation. Reduce and maintain sagebrush and rabbitbrush cover to a level from 0-10% between trails and around facilities. Restore natural visual components and reduce fuels hazards by replacing Secar bluebunch and exotic weeds with low-volume, low-height native plants. Reduce fuels hazards by removing sagebrush and other large plants near trails, parking lots, and facilities. Periodically inspect for noxious weeds and treat any infestations.

Treatment:

Chemically treat noxious weeds on approximately 3 acres in the vicinity of trail system and parking lots.

Use mechanical treatment to selectively remove fuel concentrations near trails, buildings, and parking lots.

Plant native grasses, wildflowers, and shrubs where appropriate to fill disturbed habitat or replace exotic species.

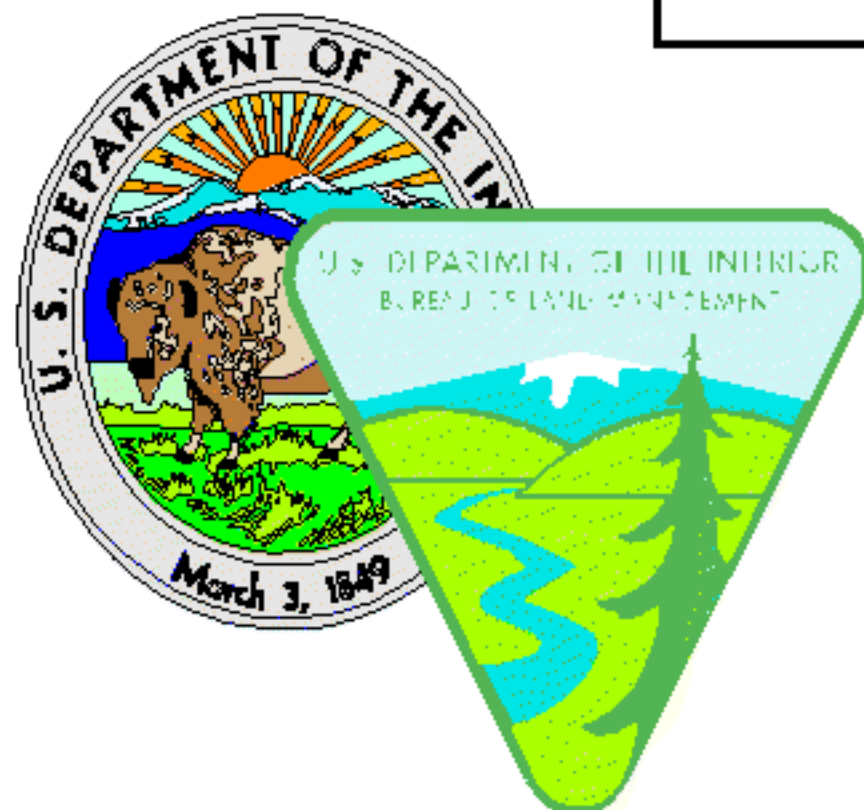
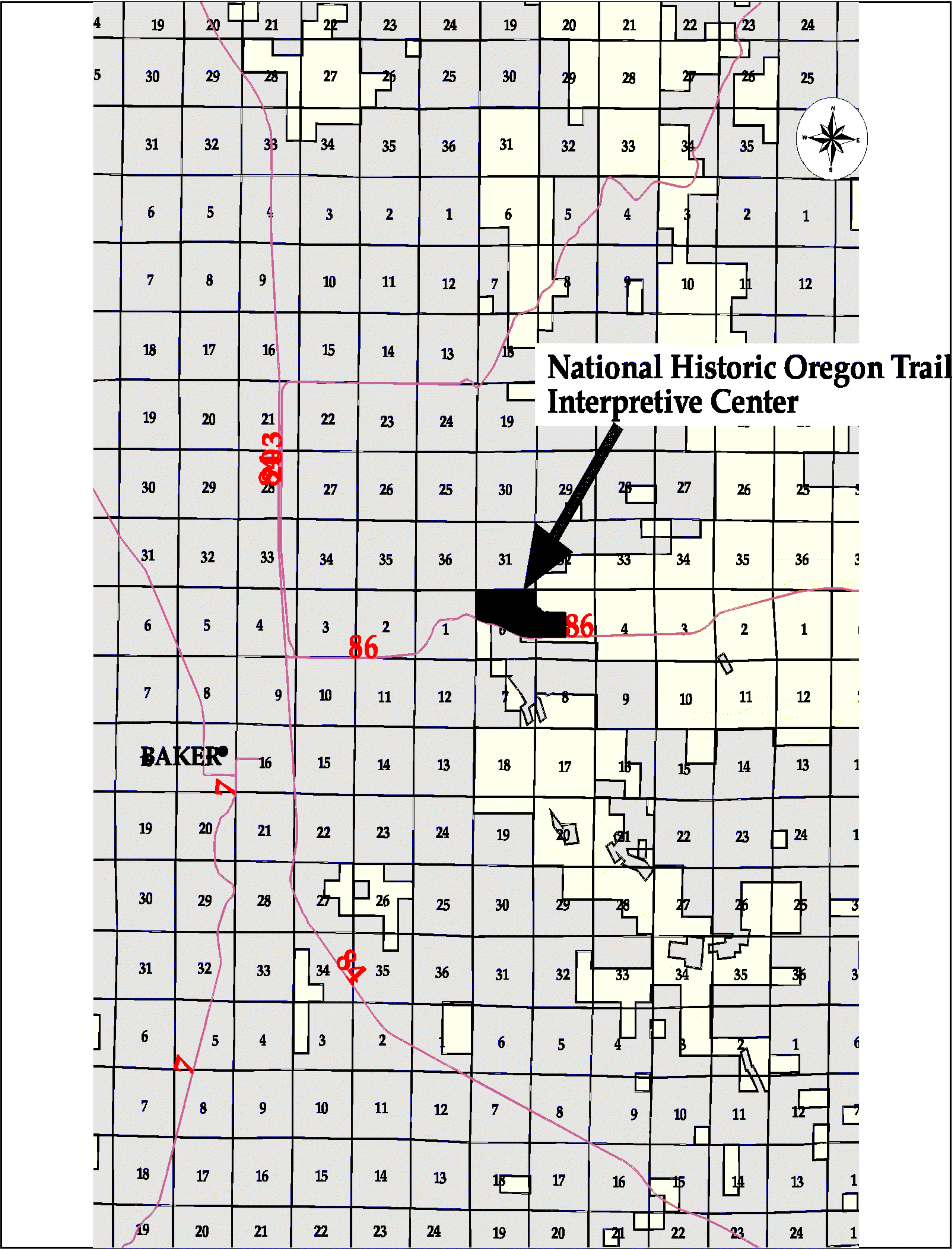
Opportunity to develop native species interpretive display (and use materials to transplant out where needed) in an intensively managed "garden" in parking area.

Opportunity to develop interpretive vista of Blue Mtns., burns.

Opportunity for additional interpretive signs or other means of exploring the vistas and identifying native plants and culturally significant plants for Native Americans.

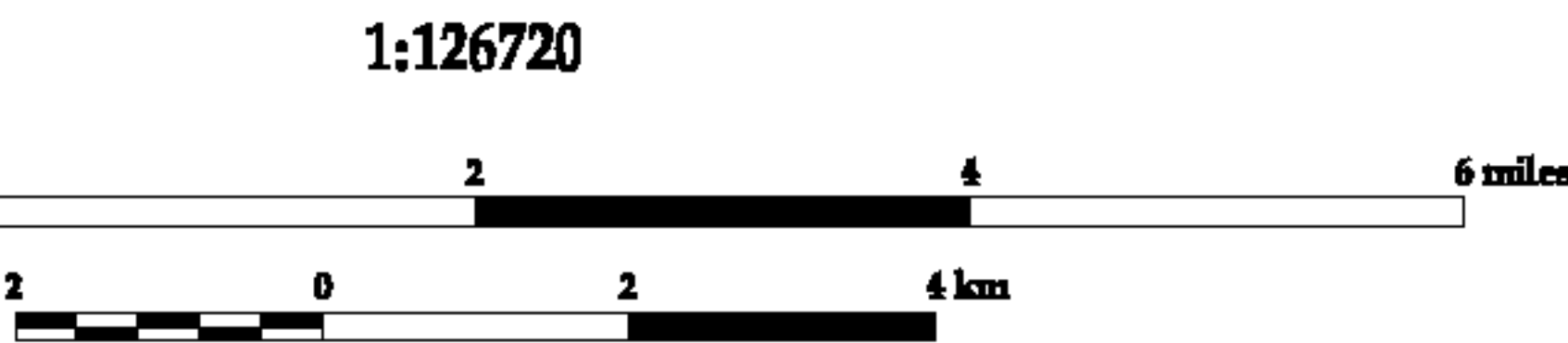


# Vicinity Map - NHOTIC Project Area



United States Department of the Interior  
Bureau of Land Management  
Oregon State Office  
P.O. Box 2965  
Portland, Oregon 97208-2965

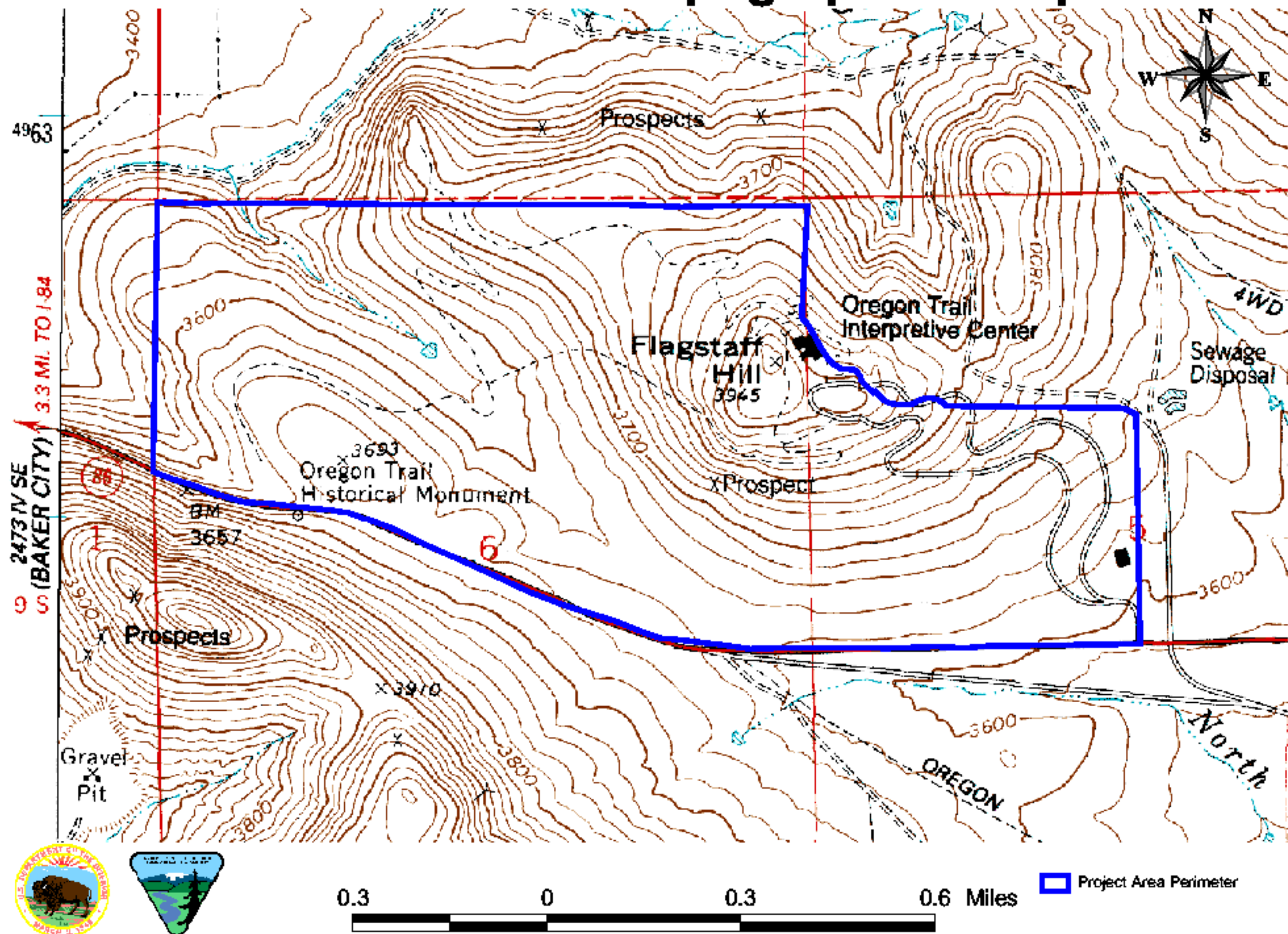
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources. This information may not meet National Map Accuracy Standards. This map was developed through digital means and may be updated without notification.



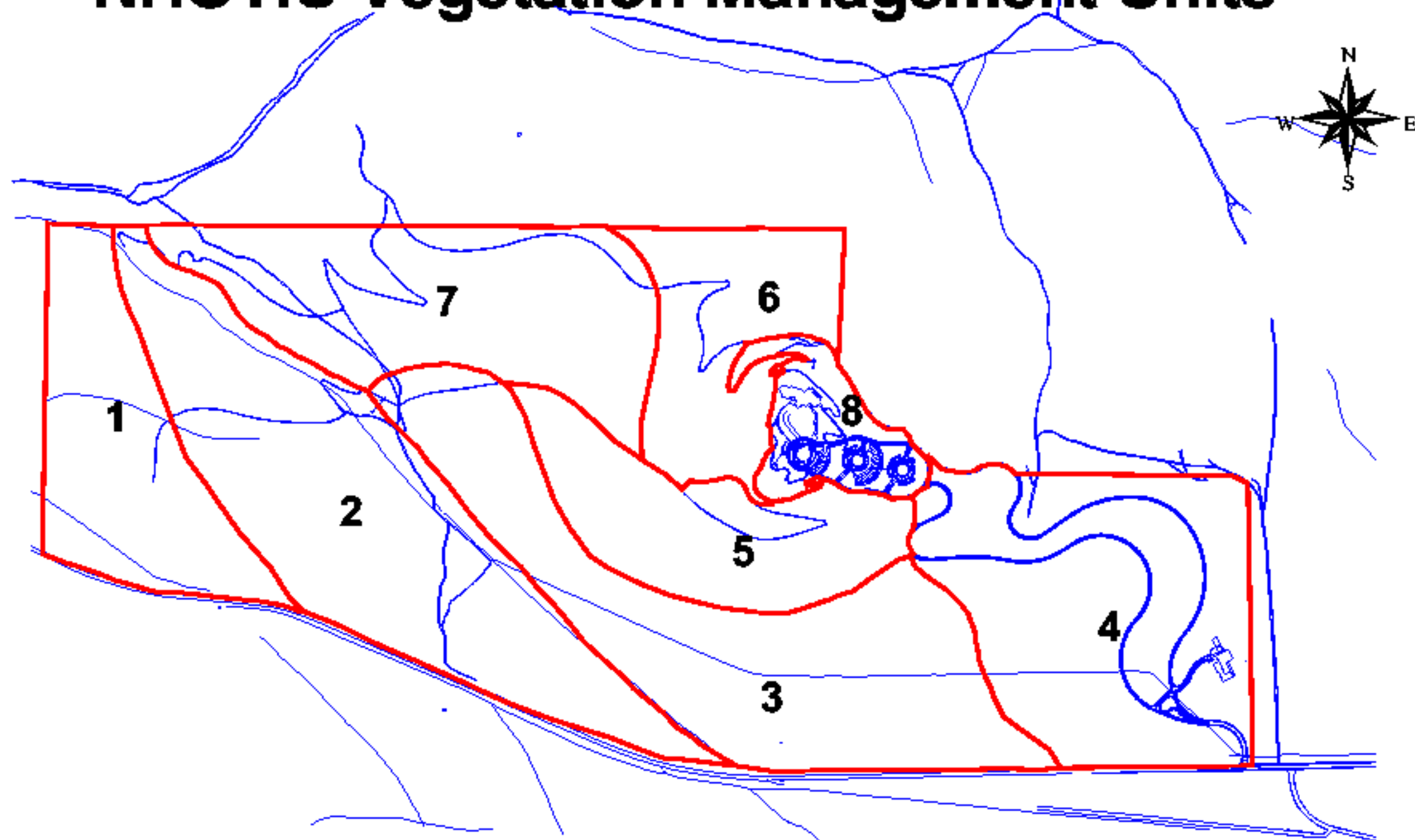
- BLM Ownership
- Private Lands
- Section Lines
- Roads
- Points of Interest
- Project Area Boundary



# NHOTIC Area Topographical Map



# NHOTIC Vegetation Management Units



0.3 0 0.3 0.6 Miles



 Unit Boundaries  
 Roads & Trails



## **APPENDIX C**

### **History of the Landscape at National Historic Oregon Trail Interpretive Center Site, Flagstaff Hill, Baker County, Oregon.**

Prepared for Vegetation Management Plan.

**January, 1999**

Researched and written by Sarah LeCompte, Historian, BLM Vale District

#### **Historical Events affecting the landscape at Flagstaff Hill**

Human presence in eastern Oregon dates back 10,000 years. In the last three centuries, Plateau tribes (Cayuse, Nez Perce) and Great Basin (Paiute, Bannock, Shoshone) were present in the area. Until approximately the 1730s and arrival of horses, migration through the area was limited, and there is no indication that the area of Baker Valley or Virtue Flat was utilized as a long-term camp site or a frequently used hunting, fishing, or foraging location.

Historical records after the 1800s indicate frequent presence of natives in travels, trading, and occasional hunting forays in the area. Euro-American presence and documentation begins with early efforts to explore and establish fur trading routes, and eventual establishment of the Oregon Trail. Wilson Price Hunt, with a party of 34, traveled through in December 1811; they are generally acknowledged as the first Euro-Americans to visit the Powder River Valley. Additional travels chronicled by various people associated with fur trade were made in 1812, 1813, 1817-1818, 1822, 1825, 1829-34. Their work was primarily concerned with locating and trapping furs, and trade work; journals do not include specific information about appearance of the landscape or vegetation. The area in present day Baker Valley and Flagstaff Hill was little visited during that time period except by occasional independent trappers and couriers.

In the 1830s, traffic via the Oregon Trail increased with missionaries and exploration parties. These travels were well-chronicled, however at that time the area today known as Flagstaff Hill was not a significant landmark and was little noted or only generally noted in journals. The 1834 expedition of Nathaniel Wyeth included naturalists John Kirk Townsend and Thomas Nuttall; however it is believed they strayed from the trail route, and did not pass by Virtue Flat or Baker Valley. Townsend's and Wyeth's writings do not record any landscape information about the Flagstaff Hill area, and Nuttall's journal has not been located, although it is recorded that he deposited specimens in the Academy of Science in Philadelphia.

Large-scale migration of settlers to Oregon began in 1843. It is estimated 55,000 emigrants passed by present day Flagstaff Hill between 1840 and 1860. Emigrant travel



included wagons, draft animals, riding horses, cattle and sheep. With a rough average of five animals for every emigrant, this would amount to an estimated 275,000 animals during that time period. Emigrants generally passed into Baker Valley (known at the time as Lone Tree Valley or Powder River Valley) in late August through early October. Emigrant numbers varied annually, from less than 500 (1856) to over 10,000 (1852). Approximately 120 written records exist of pioneer travels through this region in the 1840s, and approximately 280 for the 1850s. Again, as Flagstaff Hill was not a landmark, there are not descriptions specific to this area. The most specific descriptions are from Osborne Cross, quartermaster for the 5<sup>th</sup> Mounted Riflemen moving over 700 troops through the region in 1849, John Fothergill in 1853, and Cecilia Adams and Parthenia Blank in 1852. These only related the area as sparse grass and sage plains, with abundant grass evident in the valley bottoms.

Oregon Trail traffic continued into the 1860s, increasing dramatically after the discovery of gold at Griffin Gulch in the autumn of 1861 and the founding of Auburn in 1862. An estimated 5,000 people came into the Powder River Valley from both east and west directions of the Oregon Trail, and a spur road to Auburn developed at the base of present day Flagstaff Hill. Travel to mining districts in Idaho and to the Virtue Mine also brought people into the area. By the late 1870s alternate routes into Baker City (established 1865) were available and wagon traffic past Flagstaff Hill was greatly reduced. In 1884 railroad service through the Powder River Valley became the preferred option, and wagon traffic on the old Oregon Trail became negligible. The development of cattle, sheep, and horse ranching and mining industry became the focus of activity around Flagstaff Hill.

Development of mining and livestock industries were closely related, as economic and population growth increased the demand for draft animals and beef. Settlement in Powder River Valley began in 1862, about the same time mining began at Virtue Flat. In 1870, Baker Valley had a population of about 1,000. Populations of grazing animals in Baker County increased, and in Oregon in general, over-production of beef led to a surplus of animals by the mid 1870s. Eastward cattle drives from the mid-1870s through 1882 brought huge herds of animals through eastern Oregon each spring/summer heading to railheads in Cheyenne and Winnemucca. The largest cattle drive was an estimated 200,000 in 1882. While many of these cattle drives went through Baker County, it is believed few of the herds utilized the Oregon Trail route past Flagstaff Hill, and it is difficult to ascertain if the annual cattle drive had any significant effect on the land at this site. The area comprising the northern portion of present day Flagstaff Hill (portions of section 31&32, T8S R41E) was surveyed by the General Land Office in 1876, and the sections which include most of the present day site (portions of sections 5&6 T9S R41E) in 1882. Surveyors' notes mention the portion of the wagon road, and describe the landscape as "Land rolling, soil 2<sup>nd</sup> rate, grazing good." General notes for the entire township state "...may be classified as 2<sup>nd</sup> rate. It however is covered with excellent bunch grass...This Township forms extensive range for the ranches scattered along lower Powder River." Notes for the 1882 survey are unfortunately mostly illegible, however general landscape

notes for the survey of those sections of the township describe “country mountainous, soil rocky, no timber, undergrowth sagebrush.”

Of great impact to this site was development of the Flagstaff Mine, beginning in 1894 as the “Empire Lode” claim with a 20-foot shaft, followed by six additional claims, which were consolidated in 1896 as the French Flagstaff Gold Mining Company, Ltd. The mine underwent numerous ownership changes, construction, and improvements up to 1939, with the first 15 years seeing substantial activity. In 1897, a power plant and ten-stamp mill were reportedly built and shafts and tunnels extended to 3,500 feet. By 1901 there were 5,000 feet of tunnels, which were extended to 6,000 feet by 1933. Most of the construction and mine activity occurred in the NW 1/4 of section 5, T9S R41E.

In 1906 a twenty-stamp mill was built. Between 1907 and 1909, a 65-ton cyanide processing plant was constructed. The stamp mill was replaced with a ball mill around 1910. A photograph taken circa 1902 shows a scattering of about ten small shack-like buildings in addition to the stamp mill, a wide tailings pile, and vegetation of sparse, small sagebrush and very little grass. In its peak years in the late 1890s and early 1900s, the mine employed up to forty people, some of whom lived at the site.

Mine ownership changed 15 times between 1896 and the present. It appears it was not worked between 1942 and 1956, and has been worked sporadically since that time. In 1938, a fire destroyed most of the structures and collapsed the shaft, but it is not known if the fire spread through adjacent land. Associated with mining, although not directly with the Flagstaff Mine, is the remnant of the Eagle Valley railroad grade, part of a project to expand rail facilities to mines and uncut forests east of Baker Valley. Construction of the grade bed began around 1905, but was abandoned when investors failed to acquire funding.

Other activities at the site affecting landscape and vegetation are related to domestic livestock grazing and development of highways and settlement in the region. Jeep trails, and construction and improvements to Highway 86 left some construction disturbance, and a power line was constructed across the south section of Flagstaff Hill in the 1940s.

Although records on livestock grazing are sketchy, there is indication that open range grazing of cattle by local ranchers dates back to the 1870s. Census records indicate large numbers of cattle, horses, and sheep in Baker County for the last part of the century. According to Paul Peyron who is familiar with the area back to the mid-1920s, there were sheep and Hereford cattle in the general area, which was open range except for a few private plots. Henry Peyron was the first permittee under the Taylor Grazing Act, in 1936, with allotment 2078 (North Flagstaff-Powder River Unit). Fences and water were added. The old allotment originally included more lands to the east, with a new east boundary fenced about 1946. Operation of the ranch and allotment preference passed to William Peyron in 1959. In 1978, the permittee constructed the Flagstaff Hill fence (#4533). In

1990, the Government purchased the private lands remaining in allotment 2078 (58.7 acres) and eliminated from grazing use 507 acres. The withdrawn grazing use became part of the National Historic Oregon Trail Interpretive Center. Rehabilitation work on the jeep trail, and removal of the power line and the cattle pond began in the summer of 1990. Construction on the Interpretive Center began in May of 1991.

### **General historical perspective on burning**

During emigration years, there were occasional references to presence of smoke or evidence of burning. This was usually in the late summer and fall, and was usually attributed to Indians, although there was no direct observation of Indians setting fires. In midwestern and western North America, broadcast burning was widely used by aboriginal peoples for a variety of purposes: clearing land, harvesting, flushing game, improving forage or environmental conditions for desirable game, and improving conditions for desired plants. Early settlers in the Willamette Valley had observed annual broadcast burning, particularly by Yoncalla Indians to harvest seeds, and combined with experience of witnessing annual prairie fires in mid-western states, there was a widespread belief that all Indians utilized annual broadcast burning.

Records in journals of Euro-American settlers and travelers generally occur during the same season when lightning fires most commonly occur, and it is unclear how many of the fires attributed to Indians may have been started by natural causes. Due to the sparse population in eastern Oregon during this time, the variety of geographical areas where fires or smoke were observed, and the typical uses of broadcast burning by Cayuse, Nez Perce, Paiute, and Shoshone Indians, the regularity of grasslands and desert lands being burned cannot be determined. No evidence has been found to verify regular, annual burnings in eastern Oregon, however there was a cultural tradition of using fire to harvest crickets, and to flush game in frequently used hunting areas. Several records exist of witnessing burning of grassland in the Grande Ronde Valley on a regular basis, possibly to enhance growth of desired grasses and reduce shrubs. There are records of occasional fires witnessed south of Powder River Valley and the Flagstaff Hill site, and of observing smoke in the area.

There are no pioneer records yet found noting fire or effects of fire in the Flagstaff Hill area. Some of the notations of fire in eastern Oregon include: Ogden 1827 (south of Baker, Burnt River area), Bonneville 1834 (Grand Ronde Valley), Townsend 1834 (Grand Ronde Valley), Munger 1839 (smoke north of Blue Mountains) Farnham 1839 (smoke about 15-30 miles south of present Flagstaff Hill), Fremont 1843 (Grand Ronde Valley "recently burnt off"), Clyman 1844 (smoky atmosphere in Powder River Valley, fire and smoke near Grand Ronde Valley), Cross 1849 (fog and smoke in the mornings), John Zieber 1851 (notes evidence of trees in Burnt River Canyon which appeared to have been burned about ten years earlier), Esther Hanna 1852 (fire in Burnt River canyon), Martha Read 1852 (evidence of fire in Burnt River canyon region), Cecilia Adams and Parthenia Blank 1852

(evidence of fire in Burnt River canyon region), Ameda Jane Parker 1878 (smoke in Baker Valley attributed to Bannock uprising).

There are no records of emigrant-caused fires, either accidental or intentional, in eastern Oregon. Early Euro-American settlers throughout eastern Oregon, from the 1860s -1900 also employed broadcast burning to clear land for farming, ranching, or building, to remove debris, and employed some annual burning in an attempt to reduce shrubbery and encourage growth of desirable grasses. By the 1870s however, use of broadcast burning was beginning to be viewed as negative. In the 1870s and 1880s, concerns began that annual regimens of light burning in the fall followed too closely by spring grazing was not allowing grasses to grow, and competing shrubs were overtaking grasses, leading to unfavorable forage conditions. The general belief that wildfire and wide-scale broadcast burning was incompatible with increasing settlement, particularly farming and ranching use of rangelands, led to a preference for suppressing range fires, beginning in the 1890s.

The area around present day Flagstaff Hill was used for unregulated open range grazing of sheep, cattle, and horses. There are negligible records regarding populations of native animals in the area, so it is difficult to ascertain effects of native animals displaced by grazing of domestic animals. Records of the time period from 1880-1920 are few and vague, however it is indicated that although the area was used regularly, it was not as heavily grazed as other areas, possibly due to a lack of watering spots. According to local rancher Paul Peyron, who has lived near the site since the mid-1920s, there have been two fires south and across the highway from the Interpretive Center, and one to the east at the Rifle Range.

## **Synopsis**

-Prior to Oregon Trail emigration era, the area around present day Flagstaff Hill was little used by humans except for occasional hunting forays and travel to other destinations..

-Euro-American presence in the area began with explorations by fur-traders in 1811. The area was not important to the fur trade, and was little visited except by travelers in transit through Powder River Valley.

-Human interaction with the landscape increased in the 1830s from traffic as route of the Oregon Trail developed, passing by foot of present day Flagstaff Hill. Some scientific exploration occurred, however Flagstaff Hill was not a recognized landmark or unique or remarkable environment within eastern Oregon and is little noted in documentation by explorers and travelers.

-Large-scale migration traffic along Flagstaff Hill began in the 1840s, with annual migrations of 1,000-10,000 people plus livestock passing by the site each year, usually between August-October, into the 1860s.

-Mining activity in the area began in 1862, with development of Virtue Mine, and increased traffic related to mining at Auburn and in Idaho. Activity at Flagstaff Mine began in 1894, and contributed to disturbance of the landscape through construction, human habitation and activity, and development of mine shafts and mining activities.

-Use of the area for open range grazing of cattle, sheep, and horses dates to 1860s and 70s. Permit for grazing under conditions of the Taylor Grazing Act began in 1936 and lasted until 1990 when government removed the land from grazing.

-Development of jeep trails, power lines, and adjacent highway date to the 1930s. Fencing and water spots for grazing use from the 1930s through the 1970s.

-Construction for the Interpretive Center began in spring of 1991. Construction disturbance was replanted; water pond at base of hill removed, jeep trail and power line removed and rehabilitated.

-Historically, fire has been a very infrequent occurrence at Flagstaff Hill, with little effect on landscape. Greatest impacts on vegetation and landscape have come from use of the Oregon Trail between 1843-1865, the Flagstaff Mine and related mining activity, 1895-present, and grazing 1870s to 1990.

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Cecilia Adam, 1852  
 Henry Allyn, 1853  
 James Akin, Jr. 1852  
 John Ball, 1832  
 George Belshaw, 1853  
 Maria Parsons Belshaw, 1853  
 Parthenia Blank, 1852  
 John Boardman, 1843\*  
 Franklin Bonney, 1845  
 W.D. Brackenridge, 1841  
 Benjamin Brown, 1857-1862\*  
 Peter H. Burnett, 1843\*  
 James Clyman, 1844-1846\*  
 Sylvanus Condit, 1854  
 Mrs. A.A. Cooper, 1863  
 T.S. Conner, 1853  
 E.W. Conyers, 1852\*  
 Joseph Cornwall, 1846  
 Dr. Benjamin Cory, 1847\*  
 Sarah Marsh Cranstone, 1851  
 P.V. Crawford, 1851\*  
 Paul Darst, 1847  
 Mr. Davis, 1852  
 The Dinwiddie Journal, 1853\*  
 S.B. Eakin & Family, 1866  
 Myra F. Eells, 1838  
 W.S. Ebey Diary, 1854  
 Mrs. Elizabeth Dixon Smith Geer, 1847  
 Daniel Giles, 1853  
 John G. Glenn, 1852  
 Mrs. M.J. Goltra, 1853\*  
 Mary Augusta Dix Gray, 1836  
 Mrs. E.A. Hadley, 1851  
 Jennie Eakin Hanna, 1866  
 Esther McMillen Hannah, 1852\*  
 Absolom B. Harden, 1847\*  
 Loren B. Hastings, 1847  
 R.H. Hewitt, 1862  
 Celina E. Hines, 1853\*  
 W.A. Hockett, 1847  
 William Hoffman, 1853  
 John Ewing Howell, 1845  
 Samuel James, 1851  
 Kahler Diary, 1852  
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 Jane D. Kellogg, 1852  
 John T. Kerns, 1852\*  
 Rebecca Ketchum, 1853

Mrs. Amelia Stewart Knight, 1853  
 Jason Lee, 1834  
 Basil N. Longworth, 1853\*  
 Mrs. W.A. Loughary, 1864\*  
 H. Lueg, 1863  
 Dr. David S. Maynard, 1850\*  
 Rev. John Mcallister, 1852\*  
 James McClung, 1862\*  
 Evan S. McComas, 1862, 1863\*  
 Andrew S. McClure, 1853  
 John Minto, 1844  
 Asahel Munger and Wife, 1839\*  
 Nathaniel Myer, 1853  
 James W. Nesmith, 1843  
 William T. Newby, 1843  
 Armeda Jane Parker, 1878  
 Rev. Edward Evans Parrish, 1844  
 Charlotte Stearns Pengra, 1853  
 Martha Read, 1852  
 Robert Robe, 1851\*  
 Riley Root, 1848\*  
 Lydia A. Rudd, 1852  
 James H.B. Royal, 1853  
 Mrs. Cornelia A. Sharp, 1852  
 J.M. Shively, 1846  
 Taylor N. Snow, 1859  
 John Spencer, 1852  
 Lafayette Spencer, 1852  
 Agnes Stewart, 1853  
 Narcissa Whitman, 1836  
 John Zieber, 1851



Photographs:

McCord Collection, Baker County Public Library, Baker City, Oregon. Photographs of Flagstaff Mine, circa 1902.

Bureau of Land Management, National Historic Oregon Trail Interpretive Center collection. Baker City, Oregon. (Historic photos, aerial photos)

U.S. Department of Agriculture, Natural Resources Conservation Service, Baker City, Oregon.. Aerial photo BBB10-13 showing Flagstaff Hill, 6/14/1938

## APPENDIX D

### Laws and Executive Orders Governing Management of NHOTIC

Administration of the Bureau of Land Management, Vale District, is guided primarily by the Federal Land Policy and Management Act of 1976 (FLPMA) (90 Stat. 2743 USC 1701, et. Seq.).

Under the principles of multiple use and sustained yield, BLM has broad management responsibility over federal lands.

Comprehensive land use planning will be accomplished in order to properly utilize the lands and the resources they contain.

Management activities will strive to protect scientific, scenic, historical, ecological, environmental, air and atmosphere, water, and archaeological values.

In addition to this overall policy, the following state and federal laws and policies also direct and constrain management of specific resources and activities.

- Mining Law of 1872 (as amended)
- Antiquities Act of 1906
- Mineral Leasing Act of 1920 (as amended)
- Taylor Grazing Act of 1934
- Historic Sites Act of 1935
- Mineral Material Sales Act, 1955
- National Historic Preservation Act of 1966 (as amended)
- National Environmental Policy Act of 1970
- Mining and Minerals Policy Act of 1970
- Geothermal Steam Act of 1970
- Executive Order 11593, Protection and Enhancement of the Cultural Environment (1971)
- Executive Order 11644, Use of Off-Road Vehicles on the Public Lands (1972)
- Endangered Species Act of 1973
- Oregon Land Use Act of 1973
- National Trails System Act of 1978 (as amended)
- Archaeological Resource Protection Act of 1979
- National Materials and Mineral Policy, Research and Development Act of 1980
- 36 Code of Federal Regulations 60, National Register of Historic Places
- 36 Code of Federal Regulations 800, Protection of Historic and Cultural Properties
- 43 Code of Federal Regulations 3809, Surface Management under U.S. Mining Laws
- 43 Code of Federal Regulations 8000, Recreation Programs

## **APPENDIX E**

### **Existing Condition**

#### **Climate**

Northeastern Oregon experiences four distinct seasonal patterns. Seasonal temperatures vary considerably. The average July temperature is 67.7 degrees Fahrenheit (F); the average January temperature is 26.6 degrees (F). The valley averages 95 frost-free days annually. Yearly, the valley averages 23 days with high temperatures exceeding 90 degrees (F) and 185 days with lows below 32 degrees (F). Total annual precipitation recorded at Bake County Airport, averages 10.63 inches; 7.18 inches is delivered as rain. The area receives an average annual snowfall of 31.3 inches (3.45 inches water equivalent). A typical year has 124 clear days, 87 partly cloudy days and 154 cloudy days.

#### **Soil and Range Site Characteristics**

99C Lookout very cobbly silt loam, 2-12 percent slopes, Mountain Clayey range site.

This soil is represented on the southwest aspect of the swale leading northwest from the Oregon Trail monument on Highway 86, and on the gentle west-facing ridge leading from the Interpretive Center to the Ramada Overlook. It is formed on hills in colluvium derived from basalt and influenced by volcanic ash and loess in the surface layer. It is well drained and moderately deep to a duripanxx. Hazard of water-caused erosion is slight or moderate. The potential native plant community is dominated by Idaho fescue and Wyoming sagebrush, producing at 500 - 1500 lbs/ac depending on favorable moisture. Sub-dominants which are intermediate increasers as the site deteriorates include bluebunch wheatgrass and Sandberg bluegrass. As the site deteriorates further, Wyoming sagebrush may dominate and annual exotics increase.

114C North Powder loam, 2 to 12 percent slopes, Mountain Loamy range site.

This soil is represented on the east and southeast edge of the Interpretive Center enclosure, extending in a narrowing finger across the two access roads to the west along the southeast aspect. It is a moderately deep, well drained soil on hills formed in colluvium derived from quartz diorite and other related granitic rocks. Hazard of water-caused erosion is slight or moderate. The potential native plant community is dominated by Idaho fescue, needle and thread, and Wyoming big sagebrush, producing at 500 to 1500 lbs/acre. Thurber needlegrass, Sandberg bluegrass, and Wyoming sagebrush will increase as the site deteriorates.

142C Ruckles - Ruclick complex, 2 to 12 percent slopes, Mountain Clayey range site.

This soil complex is represented on the upper portions of Flagstaff Hill, including the area surrounding the developed facilities, parking lots, and some of the adjacent mined land. It is a mixture of shallow to moderately deep, well drained soils formed in colluvium derived from basalt and influenced by loess and volcanic ash. They are typically very stony or cobbly with some rock outcrops, and may have clays or silt-loam at the surface. Hazard of water-caused erosion is slight or moderate. The potential native plant community is dominated by Idaho fescue and Wyoming big sagebrush, with a substantial component of bluebunch wheatgrass on the Ruclick soils, producing at 300 to 1500 lbs/acre. Surface rock is limiting to livestock utilization. Rubber rabbitbrush, Sandberg bluegrass, and Wyoming sagebrush will increase as the site deteriorates. Within this mapping unit, substantial portions of the area have been impacted by construction activities, exposing and mixing the lower soil horizons.

143D Ruckles - Ruclick complex, 12 to 35 percent south slopes, a complex of Shallow South and Clayey South range sites.

This soil complex is represented on the moderate to steep south aspects of Flagstaff Hill in a broad band from the access roads in the eastern portion along the north side of the Oregon Trail to the toe of the Ramada Overlook on the western edge of the Interpretive Center. It is a mixture of shallow to moderately deep, well drained soils formed in colluvium derived from basalt and influenced by loess and volcanic ash. They are typically very stony or cobbly with some rock outcrops, and may have clays or silt-loam at the surface. The potential native plant community is dominated by bluebunch wheatgrass and Wyoming big sagebrush, with a substantial component of Idaho fescue, producing at 300 to 1200 lbs/acre. Surface rock is limiting to livestock utilization. Rubber rabbitbrush, Sandberg bluegrass, and Wyoming sagebrush will increase as the site deteriorates. Hazard of water-caused erosion is moderate to high.

143E Ruckles - Ruclick complex, 35 to 50 percent south slopes, a complex of Shallow South and Clayey South range sites.

This soil complex is represented on the steep south aspect below the Ramada Overlook on the western edge of the Interpretive Center. It is a mixture of shallow to moderately deep, well drained soils formed in colluvium derived from basalt and influenced by loess and volcanic ash. They are typically very stony or cobbly with some rock outcrops, and may have clays or silt-loam at the surface. The potential native plant community is dominated by bluebunch wheatgrass and Wyoming big sagebrush, with a substantial component of Idaho fescue, producing at 300 to 1200 lbs/acre. Surface rock is limiting to livestock utilization. Rubber rabbitbrush, Sandberg bluegrass, and Wyoming sagebrush will increase as the site deteriorates. Hazard of water-caused erosion is moderate to high.

158D Snelby stony silt loam 12 to 35 percent north slopes, Mountain North range site.

This soil is represented on the north-facing slopes north and below the Interpretive Center, from the Rabbit Mine west to below the Ramada Overlook, and also on the north-facing slopes south of the Oregon Trail at the west end of the Interpretive Center enclosure. It is a moderately deep, well-drained soil formed in colluvium derived from basalt and influenced by volcanic ash and loess. Hazard of water-caused erosion is moderate to high. The potential native plant community is dominated by Idaho fescue and Wyoming sagebrush, producing at 600 - 1700 lbs/ac depending on favorable moisture. As the site deteriorates, Wyoming sagebrush and Sandberg bluegrass may increase.

171B Virtue silt loam, 2 to 7 percent slopes, Mountain Loamy range site.

This soil is represented on the southern portion of the Interpretive Center enclosure, extending from near the Smith Ditch in the west to beyond the boundary fence on the east. It is a moderately deep, well drained soil formed in lacustrine and alluvial sediments influenced by loess and volcanic ash in the surface. Hazard of water-caused erosion is slight or moderate. The potential native plant community is dominated by Idaho fescue, needle and thread, and Wyoming big sagebrush, producing at 500 to 1500 lbs/acre. Thurber needlegrass, Sandberg bluegrass, and Wyoming sagebrush will increase as the site deteriorates.

## Summary

Soils present within the project area are generally shallow and are not very productive. When disturbed, the soils are highly to moderately on the steeper slopes. Soil classifications at the project site vary. On Flagstaff Hill itself, and on the surrounding slopes, soils are shallow, very cobbly silt loams or very clay loams. Along Highway 86, the soils are moderately deep silt or clay loams. Clay content generally increases with depth, resulting in slower water infiltration rates in the subsoil. Two of the soil types have hard pans (indurated clay pans) present at shallow depths. (U.S. Soil Conservation Service, 1998)

The two small drainages present in the area are moderately stable except where the surface has been disturbed. However, due to slow infiltration rates and sparse vegetation the area is susceptible to sheet and gully erosion and mud flows during high intensity storms.

## Visual Resources

Flagstaff Hill rises feet above the floor of the Powder River Valley. It offers a commanding view of three distinctive landscapes: the arid sagebrush plain of Virtue Flat to the east

end, and, to the west, the fertile agricultural plain for the Powder River Valley bounded by the peaks of Blue Mountains. This vantage point also presents a fine view of the Eagle Cap peaks of the Wallowa Mountains to the northeast. Flagstaff Hill is situated at the transition point between rolling sagebrush hills and the fertile Powder River Valley. The hill is composed of rocky bluffs formed by basalt flows. The slopes of the hill, and the rolling country below, are covered with mature sagebrush. At the south base of the hill lies a narrow ravine through which the Historic Oregon Trail drops into the Powder River Valley. The passageway contains well-preserved wagon ruts.

The existing visual resource management (VRM) classification is Class III. The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basis elements found in the predominant features of the characteristic landscape (BLM Manual 8410-1 [7]).

The VRM influence zone for the Flagstaff site is State Highway 86; the area where the Oregon Trail crosses the highway is the critical point of observation for the zone of influence. From this vantage point the field of view is limited.

Foreground — To the north the foreground extends just to the top of Flagstaff Hill. To the east, the foreground stops at the northern end of Virtue Flat. To the south, the abrupt ridge adjacent to State Highway 86 interrupts the foreground view. To the west the foreground consists of low rolling hills. The foreground observation zone includes approximately 1,400 acres.

Background — Two background features are visible from the observation point: the Elkhorn Ridge of the Blue Mountains to the west and the Wallowa Mountains to the north/northeast. The observation zone for the background extends over 30 miles to the north and west.

## **Social and Economic Setting**

The National Historic Oregon Trail Interpretive Center has been host to more than 1.2 million visitors since opening in May, 1992. Planned as a partnership with tourism revenue as an economic objective identified by community interests, the Interpretive Center has contributed significantly to economic recovery and diversification in eastern Oregon.

Approximately 60% of all visitors are from out-of-state, with major markets in Idaho, Washington and California. Of the in-state visitation, nearly 60% of that is from other than eastern Oregon.

Since the 1993 Oregon Trail Sesquicentennial, annual visitation levels at the Center have

declined from that year's peak of 347,000. Visitation in 1997 was 117,000 and 1998 totaled 101,000. Facility and regional marketing has become a significant issue in recent years.

Heaviest visitation occurs from May through September, and the visitor profile changes seasonally, with mostly locals during the winter months, regional school groups in the spring, vacationing individuals and families in the summer, and retired people and "snowbirds" in the fall. Typical visitor activities include sight-seeing, picnicking, hiking, natural and cultural history study, wildlife viewing and participation in developed interpretive programs and special events.

(Insert 1992-98 monthly/annual visitation chart)xx

Provision of goods, services and lodging for tourists is a substantial part of Baker City's economy. Rich in natural resource values, particularly land, water, minerals, timber and wildlife, Baker County's economy has traditionally relied on resource-based industries like agriculture, wood products and mining. Although many economic signs are positive, commodity prices for lumber and agriculture are creating challenges and hardships for these two mainstay industries.

Baker County has grown from a little over 4,000 total employed in 1986 to an all-time high of 5,510 in August 1998. This is a 38% increase, and the County's "total manufacturing jobs" of 760 is the highest of any level in the 1980s or 1990s. Baker county has seen a steady population increase so 1,200 residents since 1990, and is projected to have the second fastest growth rate of any of its four neighboring counties. Of Oregon's 36 counties, Baker County has seen its "relative ranking" in terms of income levels grow at the fourth fastest pace since 1988. In terms of visitor expenditures per county, Baker County has had the seventh fastest growth rate over the past seven years. Baker County has developed and is following a four-phase, 15 year strategic plan for community development. The National Historic Oregon Trail Interpretive Center is a cornerstone of this effort.

## Vegetation Communities

Native plant communities at Flagstaff Hill and along those portions of the Oregon Trail going through the NHOTIC site are dominated by Wyoming big sagebrush (*Artemisia tridentata* var. *wyomingensis*) and Idaho fescue (*Festuca idahoensis*). Other common plants found on the site include:

- Sandberg's bluegrass (*Poa secunda*)
- bluebunch wheatgrass (*Pseudoroegneria spicata*)
- squirreltail (*Elymus elymoides*)
- needle and thread (*Stipa comata* and *S. thurberiana*)
- Rubber rabbitbrush (*Chrysothamnus nauseosus* var. *albicaulis*)
- green rabbitbrush (*C. viscidiflorus*)

A wide variety of herbaceous wildflowers are lesser components of the vegetation. Moderately steep, rocky south slopes have a larger component of bluebunch wheatgrass and Great Basin wildrye, but are still dominated by sagebrush and fescue. The swale bottoms have increased components of needle and thread and Indian ricegrass (*Oryzopsis hymenoides*) compared to ridges and slopes, but have only traces of the Great Basin wildrye (*Elymus cinereus*), which was probably a major site component prior to historic grazing.

The Idaho fescue-dominated sites within the NHOTIC enclosure fence tend to have slightly less sagebrush than on grazed land immediately adjacent, although much of the grazed land would still be rated as mid- to late-seral range condition. Within the enclosure, Idaho fescue is generally denser, more vigorous, and has more seedheads per plant than outside the fence.

Cryptobiotic soil crusts are fully formed over large areas, with extensive lichen development, and tend to fill the interstices between grass clumps within the enclosure, creating a dramatic contrast with the more compacted, lichen-poor soils outside. The vigor and density of Idaho fescue and the coarse, irregular surface of the cryptobiotic crust are the two factors which cause a clear fence line contrast visible in aerial photographs of the Interpretive Center and surrounding grazed land. There is less bare ground and greater cover inside the enclosure. It follows that soil moisture would be retained later into the summer season within the enclosure, and that soil surface temperatures would be lower. Windy-drying effects would also be lessened.

Range site conditions within the enclosure vary from early seral to near climax potential natural community (PNC). The Wyoming sagebrush - Idaho fescue plant community on the ridge west of the Lode Mine out to the Ramada Overlook may closely resemble prehistoric conditions for a site which had not recently burned or burned at very low intensities for a 30-year interval. The quantity of sagebrush is greater than would be found if the site had experienced a summer or fall burn. The plant community along the Auburn - Burnt River



spur trail is very similar. The development of a complex cryptobiotic crust is a sure sign these sites have progressed toward PNC from their former state under grazing management. They still receive some use from deer and antelope, but have not been exposed to any concentrated trailing of large ungulates.

A portion of the southeast slope of Flagstaff Hill between the two access roads is dominated by Idaho fescue and Sandberg's bluegrass, with only a relatively small component of Wyoming sagebrush. The gross overstory appearance may be more typical of the prehistoric Idaho fescue range site at this location, but the soil there is gravelly at the surface and completely lacking cryptobiotic crust development. It is likely this site was mechanically impacted during construction of the primary access roads.

The Oregon Trail site extending in a long-shallow swale and narrow drainage from Highway 86 northwest to the corner of Section 6 is in early-mid seral condition, reflecting portions of its natural components and recent historical events as well as change induced by the intense activity surrounding the Oregon Trail migration and later mining history. Portions of the lower drainage are incised, indicating erosion, which may have been a result of grazing and livestock concentrations surrounding an old stock pond. Basin wildrye is scarce or absent in most of the drainage, where it was likely a co-dominant at the time the trail was first used. Needle and thread and Indian ricegrass are present and increasing. These were probably major vegetation components in the prehistoric plant community. On portions of the site, sagebrush, rubber rabbitbrush, and green rabbitbrush are dominant where native grasses were reduced or in poor vigor. Intermediate wheatgrass has invaded the drainage bottom, probably migrating from the highway to the southeast or the irrigated land to the northwest. A few individual plants of crested wheatgrass have invaded. Secar bluebunch wheatgrass was seeded on a reclaimed roadbed which crosses the trail. Whitetop, Scotch thistle, common mullein, and a number of other non-native forbs have invaded as well.

The steep, rocky south aspect immediately below the Interpretive Center facilities and above the Oregon Trail has been highly modified, with some portions of the slope dominated by dense exotic weeds. Other micro-sites still contain much of the original native bluebunch-fescue-wildrye components. Exotic annuals such as cheatgrass (*Bromus tectorum*), tumble mustard (*Sisymbrium altissimum*), pepperweed (*Lepidium perfoliatum*), and mullein (*Verbascum thapsus*) are abundant, and sagebrush is probably more dense than expected in an environment subject to more natural processes. The local native strain of bluebunch wheatgrass and Great Basin wildrye have probably been severely reduced from their prehistoric co-dominant community status. It is not clear how much of this effect is a result of livestock grazing or directly attributable to early mining exploration. Sagebrush and non-native weeds have filled the open niches.

Exotic weeds have invaded most habitat types to some degree, but are clearly associated with soil disturbance. Large expanses of native range are still essentially weed-free.

Concentrations of weeds occur on or adjacent to old and new trails and roads, old stock ponds, and steep slopes disturbed by mining or livestock trailing. The worst noxious weeds, such as knapweed (*Centaurea repens*) and perennial pepperweed (*Lepidium*) are adjacent to the parking lots and roads where soils are continually subject to disturbance. Whitetop (*Cardaria draba*) has invaded patches of rangeland which were historically disturbed by livestock or mining, including the steep south slope immediately above the Oregon Trail in the NENW¼ of Section 6. Several other exotic species which present local problems include yellow sweet clover (*Melilotus officinale*), common mullein, pepperweed, cheatgrass, Scotch thistle (*Onopordum acanthium*). Russian thistle (*Salsola kali*), goosefoot (*Chenopodium* spp.), and tumble mustard.

Several native species and one seeded native cultivar (see glossary), have increased on disturbed micro-sites and reclaimed trails, causing some obvious visual contrasts and increased fuels. Rubber and green rabbitbrush and Wyoming sagebrush dominate some sites where grasses were removed by mechanical disturbance. Sagebrush is probably more uniformly prevalent on all rangeland sites than in prehistoric times due to the combination of fire exclusion and grazing. “Secar” bluebunch wheatgrass is a commercially available, cultivated strain of *Pseudoroegneria spicata* (*Agropyron spicatum*), the native bluebunch wheatgrass. At NHOTIC, it has been seeded along roadsides, paved hiking trails, and on disturbed ground within parking lots, near the Interpretive Center buildings, and on reclaimed mining roads. The cultivar has a strong bunchgrass habit, forming dense clumps 2-3 times as tall and with 3-6 times the biomass as the native bluebunch on site. Where planted, it forms nearly pure, dense stands, and may be visually dominant or contrast visually with surrounding vegetation.

## **Ecological Processes**

The plant associations in this area presently recognized as PNC by the Natural Resource Conservation Service (NRCS) probably developed in response to natural and human-caused fire, seasonal semi-migratory grazing by deer, antelope, and elk, and resident populations of rabbits, rodents, birds, insects, and their associated predators in combination with local climate and soil conditions.

Prehistoric forest fire return intervals in the Elkhorn Mountains ranged from 30 to 80 years. Fire return intervals in sagebrush grasslands of the Snake River plain in Idaho prior to Euro-American settlement were approximately 80 years. Presumably periodic fire swept across the Flagstaff Hill area either from the west or south, reducing the extent of sagebrush overstory, but there is no documentation of fire return intervals specific to the sagebrush grassland of the Powder River Valley. Fire was probably the major factor controlling the occurrence and density of sagebrush.

Following settlement (please see Appendix B), in the mid- to late 1900s, land use change and grazing regulation substantially changed and restored the dominant vegetation

components of native grasses and shrubs. The process of change is still on-going.

Ecological change occurs at different rates on different soil sites, and in response to localized management. Generally, livestock use has decreased on native rangelands in the Powder River Valley over that time period. Mining activity has also generally lessened, and is focused on a few locations.

Since 1990, development of NHOTIC has introduced a major recreational/educational activity and generated new impacts from construction and reclamation/rehabilitation projects. Exclusion of livestock grazing by fencing has apparently resulted in only minor changes in overstory vegetation compared to lightly grazed lands in the “trailing corridor” outside the exclosure, but has contributed to substantially noticeable changes in soil and cryptobiotic crusts (mosses, blue-green algae, and lichens). However, the apparent lack of overstory vegetation change due to grazing exclusion is concealed by the impression created from observing the relatively narrow bands of vigorous stands of introduced “Secar” bluebunch wheatgrass and yellow sweet clover along the access roads and near developed facilities. These create the visual impression that the “rangeland grass” has dramatically increased in volume over the last decade. Competition with Secar bluebunch wheatgrass has resulted in a decline of wildflower displays along the access roads noticeable over the past five-year period.

Change in vegetation cover and plant community structure at the Interpretive Center is occurring most rapidly on mechanically disturbed soils at the edges of roads, trails, and parking lots. Small portions of these are dominated by annual grasses and weeds which change somewhat in composition each year. These sites are highly susceptible to invasions from any new seed source. However, soil chemistry and micro flora changes due to past mixing of soil horizons, continued surface disturbance, and other factors favor establishment of non-native species, including noxious weeds.

Native species which have been able to re-establish include several wildflower species, Sandberg’s bluegrass, and Great Basin wildrye. Idaho fescue and native bluebunch wheatgrass, sagebrush, and rubber rabbitbrush spread and fill in well in these sites if soils are not continually reworked or compacted, taking advantage of available deep soil moisture. On reclaimed and redeemed roads and trails, Secar bluebunch has the capacity to dominate and exclude sagebrush and wildflower species. In the most vigorous stands, it has formed a monoculture, with some mosses able to re-establish on the dense, somewhat acidic organic litter and humus layer beneath the grass.

The swale and narrow drainage containing the Oregon Trail have been protected from mechanical disturbance since completion of projects to reclaim roads, construct foot trails, and remove and rehabilitate the dam of a livestock water pond. Human activity is limited to walking along developed trails, and there is little or no sign of foot traffic off those trails. Soils disturbance is mostly limited to minor erosion along the edges of the incised channel

at the bottom of the swale. Present plant community complexes are still in the early stages of recovery from heavy livestock use associated with the pond.

Idaho fescue sites on north slopes and ridges have been largely undisturbed and protected since construction of foot trails and exclusion of livestock. Plant cover and community structure appear to be very stable, with a moderate component of sagebrush persisting from the effects of historical grazing and lack of recent fire or insect outbreaks. There are minor components of noxious weeds, and little or no indication of noxious weed infestations, except for some whitetop near the trails. Whitetop is being treated with herbicide.

## **Fire Risk Factors Relating to Vegetation**

The greatest risks of fire ignition are from visitors or motorists either at the Interpretive Center, or on the State highway below, from adjacent farmland or nearby mining activities, or from lightning strikes during summer storm events, probably in that order or likelihood. Behavior of the fire and direction and rate of spread would depend on the point of ignition, topography, fuels, and weather.

A fire hazard analysis was conducted during 1998. Fuel models for the Interpretive Center area are based on a grassland model (Idaho fescue/bluebunch wheatgrass), a mixed grass/shrub model, and a shrub-dominated model. The fuel load ratings described are based on the upper limits of predicted vegetation production capability for the soil-range site descriptions and observed conditions in the field. Average fuel loads over a period of years would likely be lower.

The **Idaho fescue bluebunch grassland model** is rated at approximately 1500 lbs/acre of current-year production (nearly all herbaceous), with an allowance for 1500 lbs/acre of accumulated dried organic litter. In poor production years, the native rangeland sites may produce from 300 to 500 lbs/acre. Fuels are concentrated below 0.5 m. (19 inches). Narrow bands of Secar bluebunch along roads, on reclaimed trails, and north of the warehouse site may hold more than twice this fuel load, nearly twice as tall. Small patches of annual grasses and forbs may create intermediate conditions.

Total maximum fuel loads are approximately 1.5 tons/acre for native grassland, and 3-4 tons/acre in pure stands of dense Secar bluebunch. This model applies only to very small portions of the area at present, since nearly all lands fall into the grassland/shrub or shrub-dominated models. However, this model does reflect the likely condition of most of the grassland/shrub complex for a number of years after an initial fire event, whether prescribed or unplanned.

The **grassland/shrub model** is rated at approximately 1500 lbs/acre of current-year production (herbaceous and woody), with an allowance for 1200 lbs/acre of dried organic

finer, plus 2000-4000 lbs/acre standing woody biomass. In poor production years, the native rangeland sites may produce from 300 to 500 lbs/acre; however, this would not affect standing woody biomass.

Total maximum fuel loads are in the range of 2-3 tons/acre. Ten and 100-hour fuels are distributed unevenly through the vegetation complex. Most of the fuel is held within 1 m. (39 inches) of the ground. Flames are generally spread through the herbaceous understory and ignite the woody canopy in wind or where they are sufficiently close to bunchgrass. Comparison with lightly grazed lands in a trailing corridor immediately outside the Interpretive Center enclosure fence and on the same soil sites as inside the fence indicated removal (by livestock) of 20-30 percent of the herbaceous organic fines, an insufficient difference to significantly affect fire behavior, and less than the natural range of variability in annual fuels production due to local climate and weather patterns. If a range site of this nature were heavily grazed (more than 50% removal of annual herbaceous production), it would probably develop the characteristics of the shrub-dominated site model over a period of years.

The **shrub-dominated model** is rated at approximately 1500 lbs/acre of current-year production (herbaceous and woody), with an allowance for 500 lbs/acre of dried organic fines, plus 4000-8000 lbs/acre standing woody biomass. In poor production years, the native rangeland sites may produce from 300 to 500 lbs/acre; however, this would not affect standing woody biomass.

Total maximum fuel loads are in the range of 3-5 tons/acre. Ten and 100-hour fuels are distributed more or less evenly through the site. Most of the fuel is held up from the ground between 0.5-1.5 m. (19-59 inches). The herbaceous material in the understory is sometimes dominated by annual grasses and forbs which are substantially dry by mid- to late June. Flames are generally spread through the canopy by wind, and will drop to the ground without wind.

## Wildlife

Sagebrush density and vegetation component diversity within the planning area are in a condition that provides habitat for a wide variety of terrestrial wildlife species. The high density of sagebrush and the relatively low diversity of plant species is beneficial for hiding cover for several species of wildlife (rabbits, badgers, sage grouse); however, it precludes other species of wildlife that need open grassland areas for foraging and breeding (gophers, ground squirrels, deer). This prevents raptors from using the area to any extent due to the lack of available prey species and dense cover that prohibits raptors from capturing prey. The lower densities of sagebrush located on the west side of the Interpretive Center in Vegetation Unit #6, in portions of Units #7, and #2, and along the roads in Unit #4, may provide habitat for those species of wildlife that rely on lower densities of shrub cover and predominately grass/forb vegetation communities. Many of these locations are situated near trails or roads and have high disturbance to the area by public use. Not including those locations that have buildings on them and roads, parking lots, and trails, there is approximately 416 acres of sagebrush habitat within the planning area.

The planning area is a minor component of the sagebrush communities that exist in the general geographic area. The area immediately to the east, south and north of the planning area is comprised of approximately 2,000,000 acres of sagebrush vegetation communities. These communities span several miles in each direction, with a wide diversity of sagebrush densities, cover percentages, and understory composition. The area directly to the west of the planning area is developed agricultural lands and residential areas.

Due to disturbance and human presence in the planning area along the trails, roads, and near the structures, many wildlife species would not use these areas and the immediate vicinity surrounding these areas. Use of the entire planning area by wildlife will fluctuate relative to use by visiting public. During those times of the year when the planning area has a high number of visitors, the wildlife in the geographical area tend to avoid the planning area. During those times when the planning area has a low number of visitors and little disturbance, wildlife in the area will use the planning area more frequently. A list of wildlife species that may occur in and around the planning area is included below.

This area was historically considered a sage grouse strutting location (lek). Although individual sage grouse have been observed in and around the planning area, there have been no recorded observations of sage grouse using the planning area as a lek for approximately 10 years. This would be a result of increased density of sagebrush in the immediate area, decreasing the area's effectiveness as a lek. Sage grouse sometimes congregate during summer near irrigated alfalfa fields. They will fly into alfalfa fields in early morning and late evening to feed, then return to surrounding sagebrush-covered hillsides to loaf and roost. Sage grouse continue to use these areas throughout the late

summer and early fall as long as forbs are present. Hard frosts generally bring an end to this activity (ODFW, 1993). With the alfalfa fields located on the west boundary of the planning area, the potential for sage grouse to use the planning area for loafing or roosting sites during the summer and early fall is greatly increased. In addition, sage grouse would use the planning area for travel corridors from leks and nesting locations to feeding sites in the alfalfa fields.

The planning area also provides cover for mule deer that browse in the alfalfa fields during early morning and late evening, then move to the sagebrush-covered areas for cover and bedding sites during midday.

There are particular soils in the planning unit that are conducive to burrowing wildlife species, including the pygmy rabbit, which is a species of concern to the U.S. Fish and Wildlife Service. These soils are highly productive soils that are capable of producing tall shrubs with deeper root structures. The combination of tall shrubs with high cover percentages (near 30%) and the deep, loose soils are preferred by the pygmy rabbit. The planning unit has approximately 260 acres of land that have the soils with the potential for these characteristics to occur and consequently provide suitable habitat for the pygmy rabbit.

Other wildlife use in the planning area include rabbit and badger activity. These mammals are located throughout the planning area. Rabbits and other small mammals in the planning area provide food for ferruginous hawks and golden eagles that are known to nest in areas adjacent to the planning area.

The U.S. Fish and Wildlife Service has proposed the western sage grouse as a candidate species for listing as threatened or endangered. No threatened and endangered wildlife species were found on NHOTIC.

The tables on the next page display wildlife species that could potentially occur in habitat types similar to those within the boundaries of the National Historic Oregon Trail Interpretive Center and within the Vegetation Management Project boundaries.

## APPENDIX F

<b>SCIENTIFIC NAME</b>	<b>COMMON NAME</b>	<b>FAMILY</b>
<i>Achillea millefolium</i>	Common yarrow	Asteraceae
<i>Agropyron cristatum</i>	Crested Wheatgrass	Poaceae
<i>Elymus lanceolatus</i> <i>ssp. lanceolatus</i>	Thickspike wheatgrass	Poaceae
<i>X Pseudelymus saxicola</i>		Poaceae
<i>Pseudoroegneria spicata</i>	Bluebunch wheatgrass	Poaceae
<i>Allium acuminatum</i>	Tapertip onion	Liliaceae
<i>Allium tolmiei</i>	Tolmie's wild onion	Liliaceae
<i>Amsinckia menziesii</i>	Menzies' fiddleneck	Boraginaceae
<i>Antennaria dimorpha</i>	Low pussy-toes	Asteraceae
<i>Artemisia tridentata</i> <i>ssp. tridentata</i>	Big Sagebrush	Asteraceae
<i>Artemisia tridentata</i> <i>ssp. wyomingensis</i>	Wyoming big sagebrush	Asteraceae
<i>Astragalus atratus</i> <i>var. owyheensis</i>	Mourning milk-vetch	Fabaceae
<i>Astragalus filipes</i>	Threadstalk milk-vetch	Fabaceae
<i>Astragalus purshii</i>	Pursh's milk-vetch	Fabaceae
<i>Grayia spinosa</i>	Spiny hopsage	Chenopodiaceae
<i>Balsamorhiza sagittata</i>	Arrowleaf balsamroot	Asteraceae
<i>Bromus tectorum</i>	Cheat grass	Poaceae
<i>Calochortus macrocarpus</i>	Sagebrush mariposa	Liliaceae
<i>Cardaria draba</i>	White-top	Brassicaceae
<i>Castilleja angustifolia</i>	Desert paintbrush	Scrophulariaceae
<i>Chaenactis douglasii</i>	Douglas false yarrow	Asteraceae
<i>Chenopodium foliosum</i>	Leafy goosefoot	Chenopodiaceae
<i>Chrysothamnus</i> <i>viscidiflorus</i>	Green rabbitbrush	Asteraceae



<b>SCIENTIFIC NAME</b>	<b>COMMON NAME</b>	<b>FAMILY</b>
<i>Cirsium vulgare</i>	Common thistle	Asteraceae
<i>Collinsia parviflora</i>	Small-flower blue-eyed Mary	Scrophulariaceae
<i>Cordylanthus ramosus</i>	Bushy birdbeak	Scrophulariaceae
<i>Crepis acuminata</i>	Tapertip hawksbeard	Asteraceae
<i>Cystopteris fragilis</i>	Brittle bladder-fern	Polypodiaceae
<i>Delphinium nuttallianum</i>	Larkspur	Ranunculaceae
<i>Descurainia sophia</i>	Flixweed tanseymustard	Brassicaceae
<i>Dodecatheon conjugens</i>	Desert shooting star	Primulaceae
<i>Draba verna</i>	Spring draba	Brassicaceae
<i>Leymus cinereus</i>	Giant wildrye	Poaceae
<i>Erigeron chrysopsidis</i> <i>ssp. chrysopsidis</i>	Dwarf yellow fleabane	Asteraceae
<i>Erigeron linearis</i>	Line-leaf fleabane	Asteraceae
<i>Erigeron pumilis</i> <i>ssp. intermedius</i>	Shaggy fleabane	Asteraceae
<i>Erodium cicutarium</i>	Filaree	Geraniaceae
<i>Festuca idahoensis</i>	Idaho fescue	Poaceae
<i>Lappula occidentalis</i> <i>var. occidentalis</i>	Western tickseed	Boraginaceae
<i>Lepidium campestre</i>	Field pepperweed	Brassicaceae
<i>Lepidium perfoliatum</i>	Clasping peppergrass	Brassicaceae
<i>Leptodactylon pungens</i>	Prickly phlox	Polemoniaceae
<i>Lithophragma glabrum</i>	Rocketstar	Saxifragaceae
<i>Lomatium donnellii</i>	Donnell's desert-parsley	Apiaceae
<i>Lomatium macrocarpum</i>	Large flower desert-parsley	Apiaceae
<i>Lupinus holosericeus</i>	Silky lupine	Fabaceae
<i>Marrubium vulgare</i>	Horehound	Labiatae
<i>Oryzopsis hymenoides</i>	Indian ricegrass	Poaceae
<i>Penstemon cusickii</i>	Cusick's penstemon	Scrophulariaceae
<i>Penstemon speciosus</i>	Showy penstemon	Scrophulariaceae

## Appendix F

<b>SCIENTIFIC NAME</b>	<b>COMMON NAME</b>	<b>FAMILY</b>
<i>Phacelia hastata</i>	Whiteleaf phacelia	Hydrophyllaceae
<i>Phacelia linearis</i>	Threadleaf phacelia	Hydrophyllaceae
<i>Phlox hoodii</i>	Hood's phlox	Polemoniaceae
<i>Phoenicaulis cheiranthoides</i>	Daggerpod	Brassicaceae
<i>Poa secunda</i>	Bluegrass	Poaceae
<i>Ranunculus glaberrimus</i>	Sagebrush buttercup	Ranunculaceae
<i>Ceratocephala testiculata</i>	Buttercup	Ranunculaceae
<i>Ribes cereum</i>	Squaw currant	Grossulariaceae
<i>Salsola australis</i>	Russian thistle	Chenopodiaceae
<i>Sisymbrium altissimum</i>	Jim Hill mustard	Brassicaceae
<i>Elymus elymoides</i>	Squirreltail	Poaceae
<i>Solanum dulcamara</i>	Felonwort	Solanaceae
<i>Sphaeralcea munroana</i>	Munro's globe-mallow	Malvaceae
<i>Stipa comata</i>	Needle and thread	Poaceae
<i>Stipa occidentalis</i>	Western needlegrass	Poaceae
<i>Stipa thurberiana</i>	Thurber needlegrass	Poaceae
<i>Tetradymia canescens</i>	Gray horse-brush	Asteraceae
<i>Tragopogon dubius</i>	Yellow salsify	Asteraceae
<i>Verbascum thapsus</i>	Common mullein	Scrophulariaceae
<i>Zigadenus venenosus</i>	Meadow death-camas	Liliaceae

## APPENDIX G

**Wildlife Species that primarily use sagebrush and bitterbrush communities for reproduction and feeding.**

SCIENTIFIC NAME	COMMON NAME
<b>Amphibians</b>	
<i>Scaphiopus intermontanus</i>	Great Basin spadefoot toad
<i>Ambystoma macrodactylum</i>	long-toed salamander
<i>Pseudacris regilla</i>	Pacific treefrog
<i>Bufo boreas</i>	Western toad

<b>Reptiles</b>	
<i>Pituophis catenifer</i>	gopher snake
<i>Hypsiglena torquata</i>	night snake
<i>Sceloporus graciosus</i>	sagebrush lizard
<i>Phrynosoma douglassii</i>	short-horned lizard
<i>Uta stansburiana</i>	side-blotched lizard
<i>Masticophis taeniatus</i>	striped whipsnake
<i>Sceloporus occidentalis</i>	western fence lizard
<i>Crotalus viridis</i>	western rattlesnake
<i>Eumeces skiltonianus</i>	western skink

<b>Birds</b>	
<i>Turdus migratorius</i>	American robin
black-billed magpie	<i>Pica pica</i>
<i>Spizella breweri</i>	Brewer's sparrow
<i>Athene cunicularia</i>	burrowing owl
<i>Larus californicus</i>	California gull
<i>Chordeiles minor</i>	common nighthawk
<i>Corvus corax</i>	common raven
<i>Pipilo chlorurus</i>	green-tailed towhee
<i>Passerina amoena</i>	lazuli bunting
<i>Lanius ludovicianus</i>	loggerhead shrike
<i>Zenaida macroura</i>	mourning dove
<i>Salpinctes obsoletus</i>	rock hen
<i>Sayornis saya</i>	Say's phoebe
<i>Sturnella neglecta</i>	western meadowlark

SCIENTIFIC NAME	COMMON NAME
<b>Mammals</b>	
<i>Felis rufus</i>	bobcat
<i>Neotoma cinera</i>	bushy-tailed woodrat
<i>Peromyscus crinitus</i>	canyon mouse
<i>Canis latrans</i>	coyote
<i>Peromyscus maniculatus</i>	deer mouse
<i>Perognathus parvus</i>	Great Basin pocket mouse
<i>Microtus longicaudus</i>	long-tailed vole
<i>Mustela frenata</i>	long-tailed weasel
<i>Odocoileus hemionus</i>	mule deer
<i>Thomomys talpoides</i>	northern pocket gopher
<i>Antrozous pallidus</i>	pallid bat
<i>Antilocapra americana</i>	pronghorn antelope
<i>Sorex vagrans</i>	vagrant shrew
<i>Reithrodontomys megalotis</i>	western harvest mouse
<i>Marmota flaviventris</i>	yellow-bellied marmot

**Wildlife species that primarily use sagebrush and bitterbrush communities for feeding only.**

SCIENTIFIC NAME	COMMON NAME
<b>Birds</b>	
<i>Falco sparverius</i>	American kestrel
<i>Tyto alba</i>	barn owl
<i>Euphagus cyanocephalus</i>	Brewer's blackbird
<i>Psaltirparus minimus</i>	bushtit
<i>Stellula calliope</i>	calliope hummingbird
<i>Alectoris chukar</i>	chukar
<i>Empidonaz oberholseri</i>	dusky flycatcher
<i>Buteo regalis</i>	ferruginous hawk
<i>Aquila chrysaetos</i>	golden eagle
<i>Bubo virginianus</i>	great horned owl
<i>Chondestes grammacus</i>	lark sparrow
<i>Sialis currucoides</i>	mountain bluebird
<i>Lanius excubitor</i>	northern shrike
<i>Buteo jamaicensis</i>	red-tailed hawk
<i>Columbia livia</i>	rock dove
<i>Buteo lagopus</i>	rough-legged hawk
<i>Asio flammeus</i>	short-eared owl
<i>Cathartes aura</i>	turkey vulture
<i>Sialia mexicana</i>	western bluebird
<i>Aeronautes sazatalis</i>	white-throated swift
<i>Empidonax traillii</i>	willow flycatcher

<b>Mammals</b>	
<i>Taxidea taxus</i>	badger
<i>Eptesicus fuscus</i>	big brown bat
<i>Myotis californicus</i>	California myotis (bat)